Gas Journal

VOL. 282. 107th YEAR. LONDON, APRIL 27, 1955. Nº 4795. PRICE 1/3

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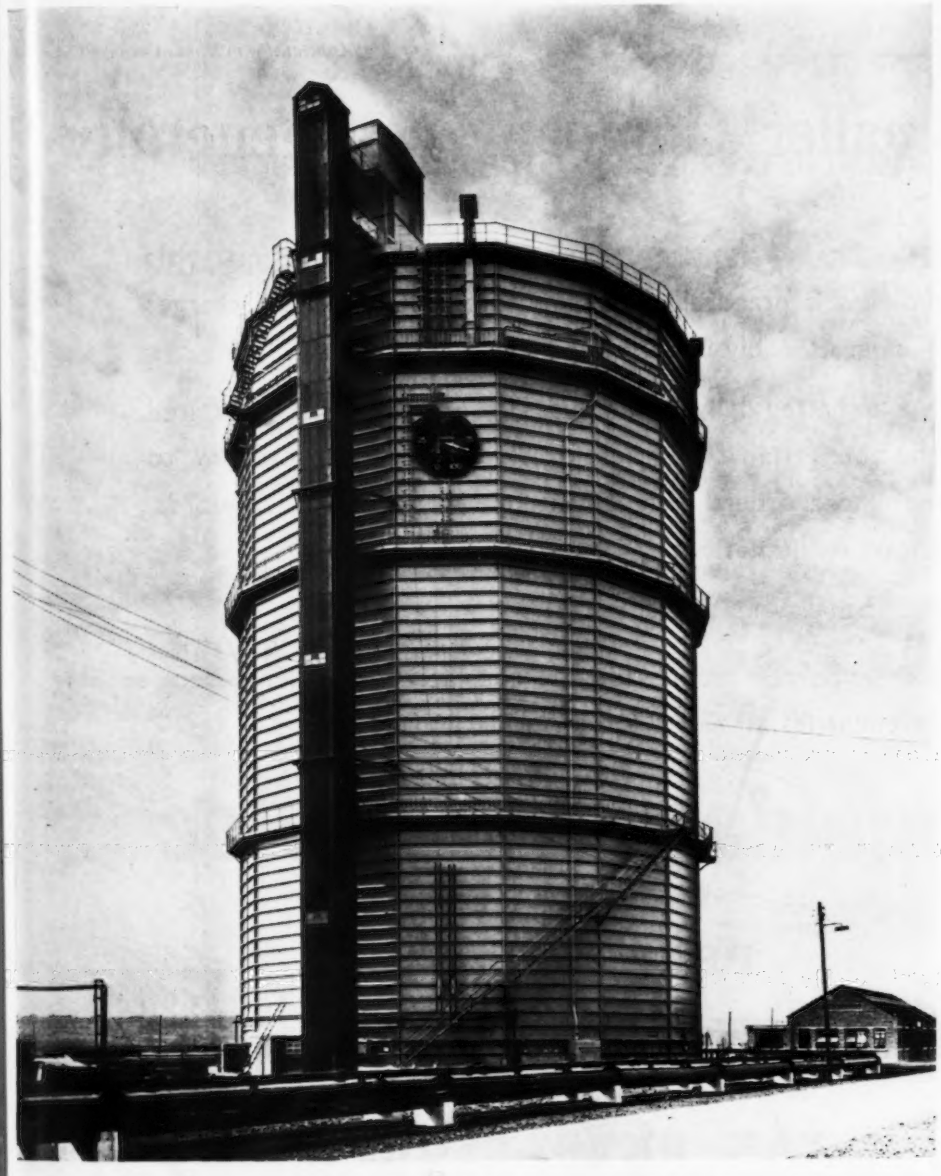

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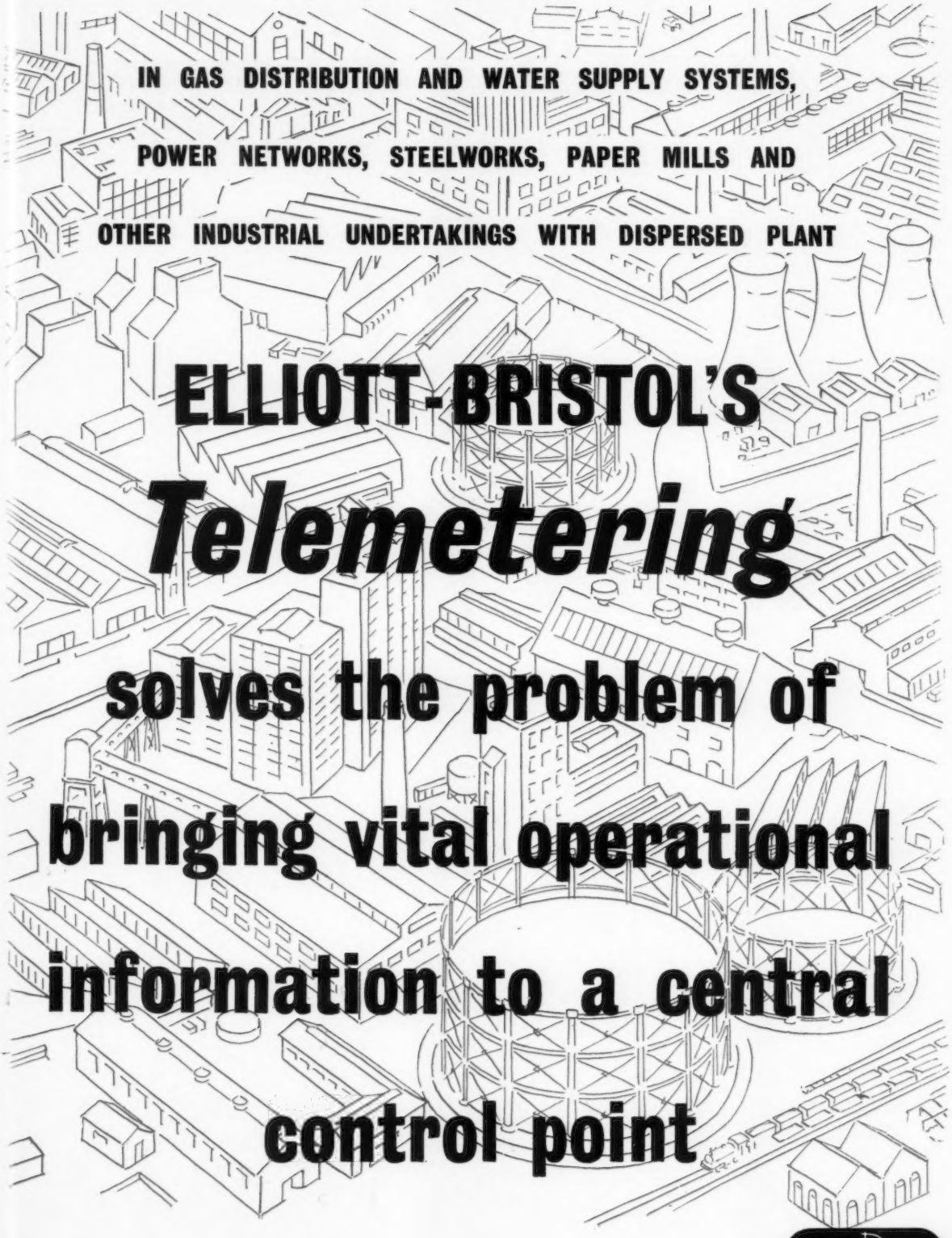

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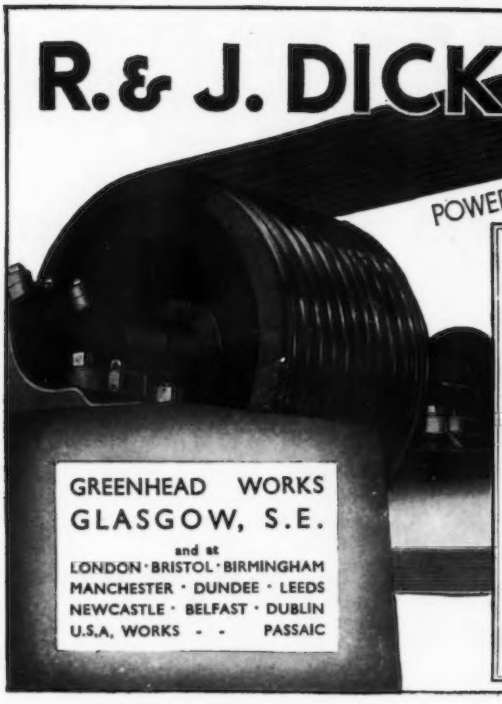

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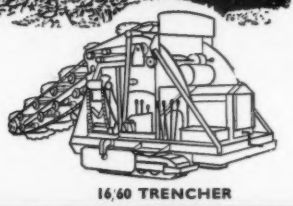

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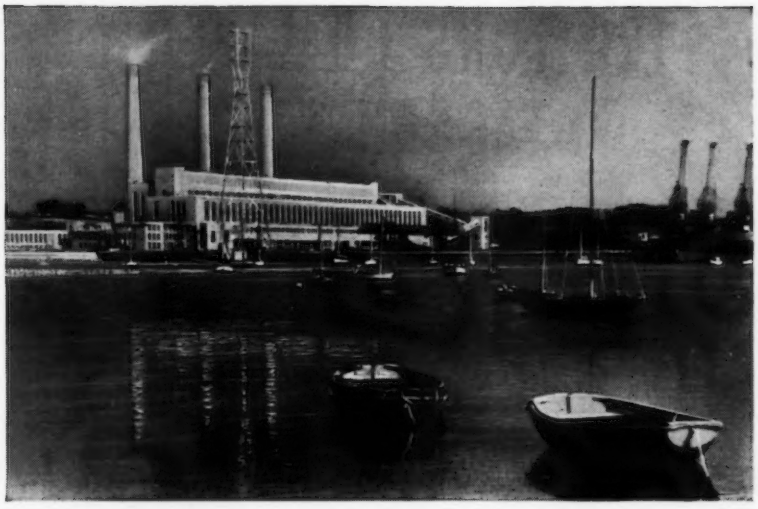

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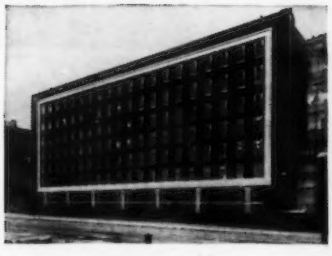

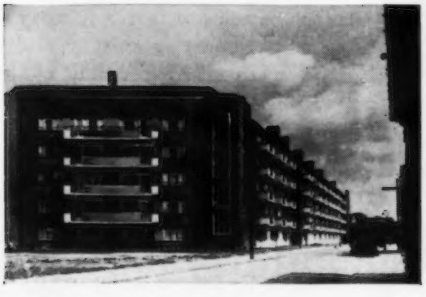

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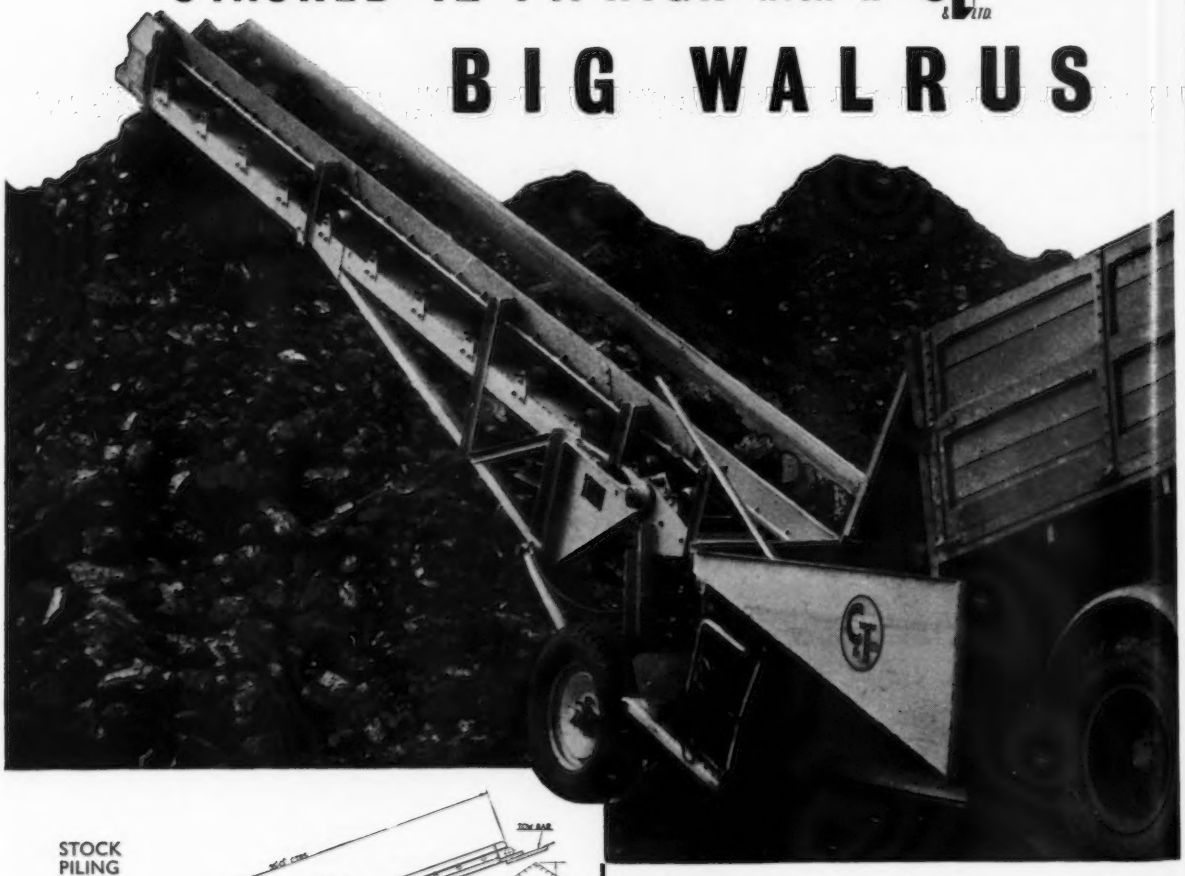

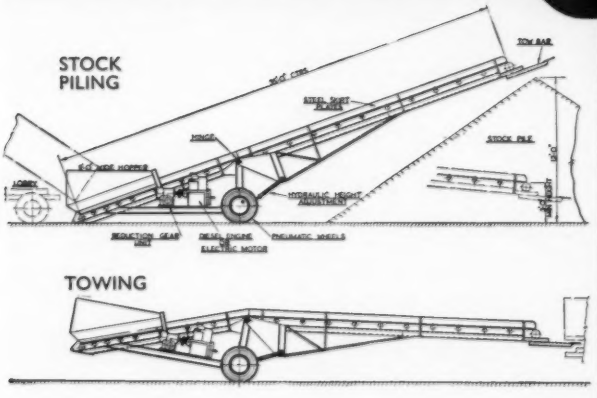

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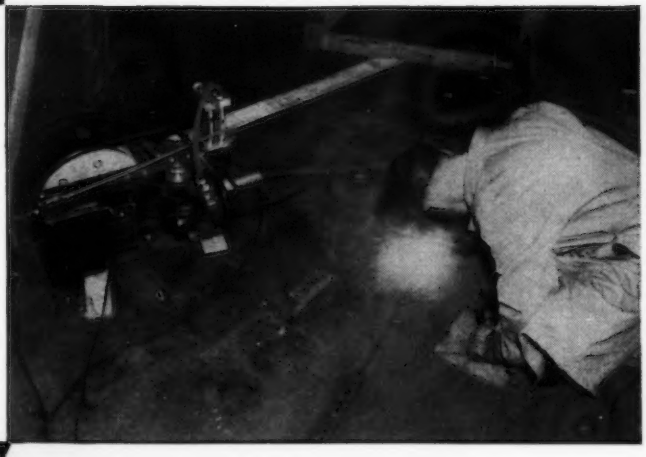

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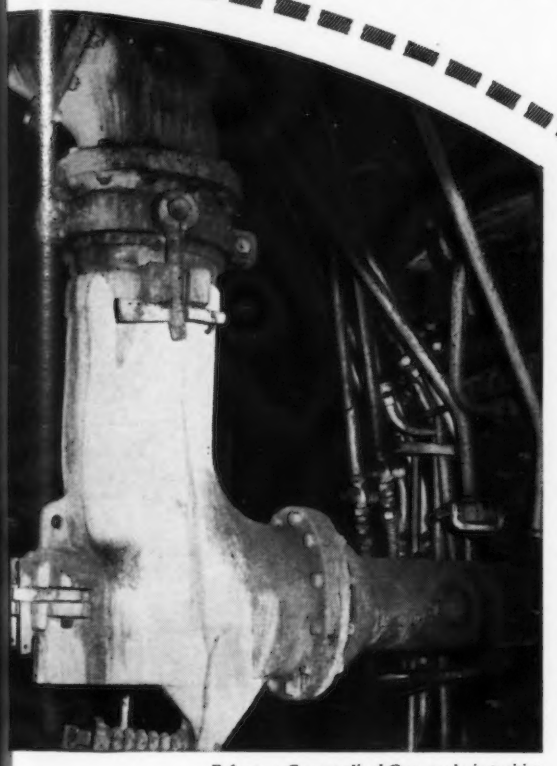

Refractory Concrete-lined Goose necks in position on blast furnace from bustle pipe to tuyere

A battery of refractory-concrete-lined ascension pipes in service.

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Coke oven ascension pipes showing Refractory Concrete lining.

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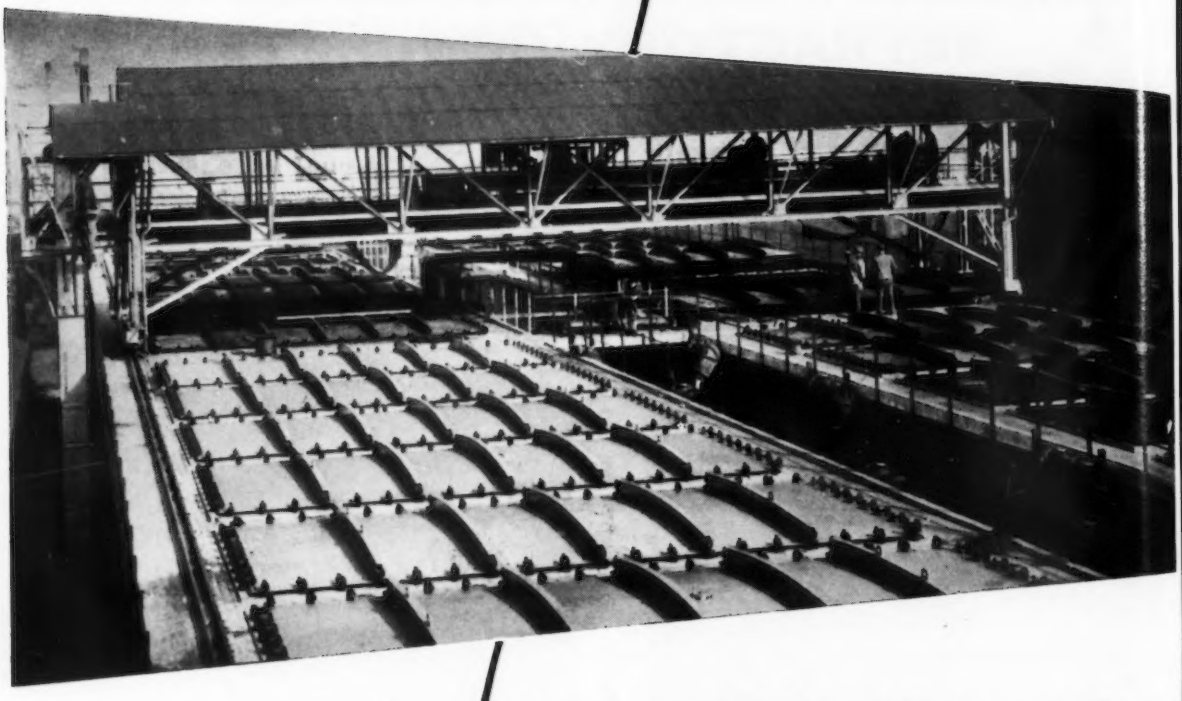

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VERTICALS..

View showing top of Mechanical Producer Charging Platform and setting controls with platforming at Bradford Road Works, Manchester.

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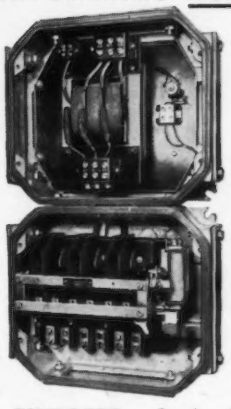
Refer to Page 22 "Electrical Accidents and their causes 1952" M o L 929

INCORPORATING AUTOMATIC CIRCUIT BREAKERS IN EACH OUTGOING WAY



A triple pole 30 amp. Circuit Breaker with core balance transformer and E.L. relay.

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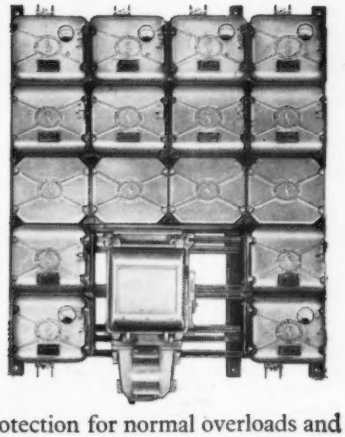

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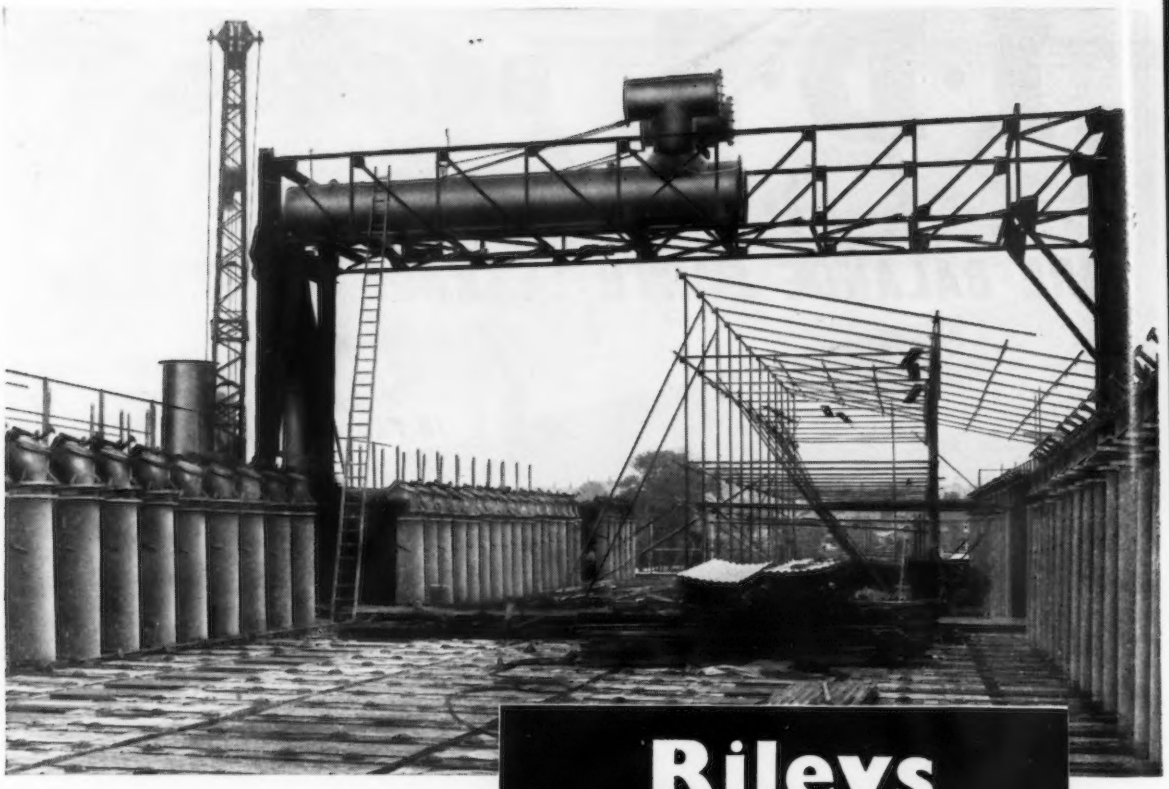

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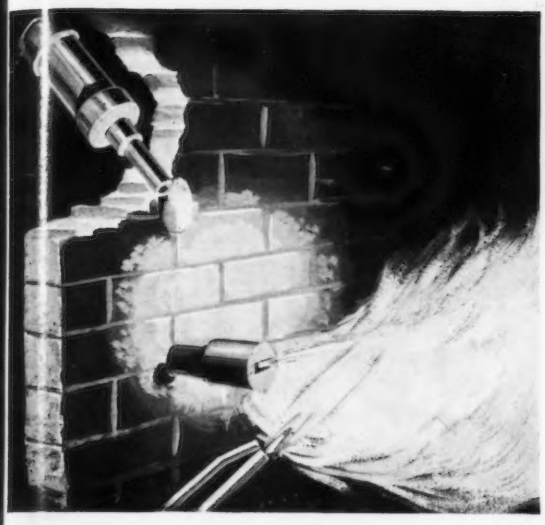

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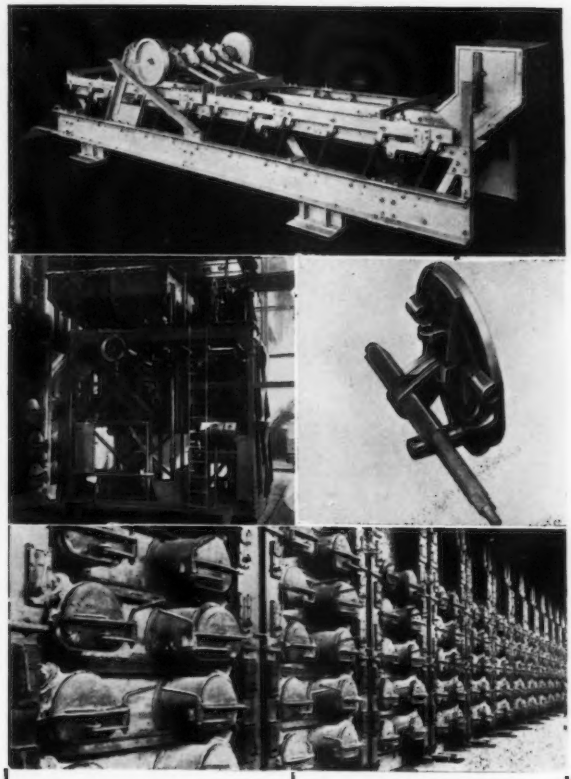

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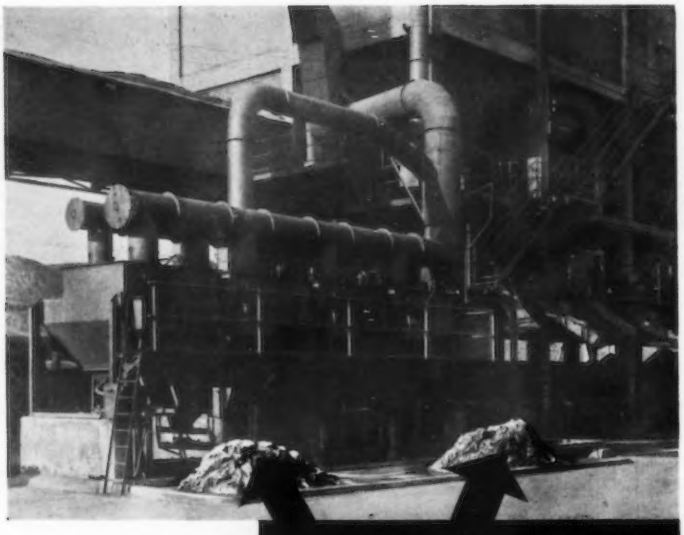

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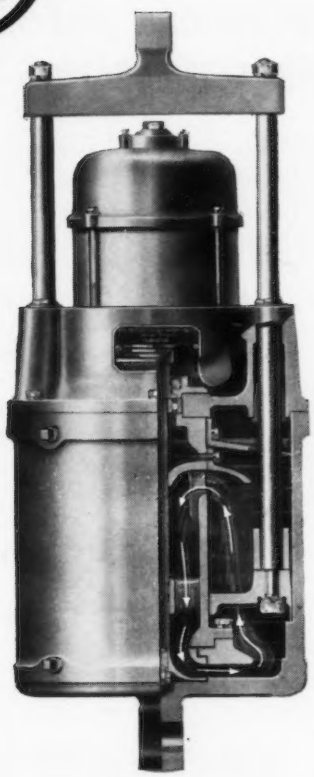

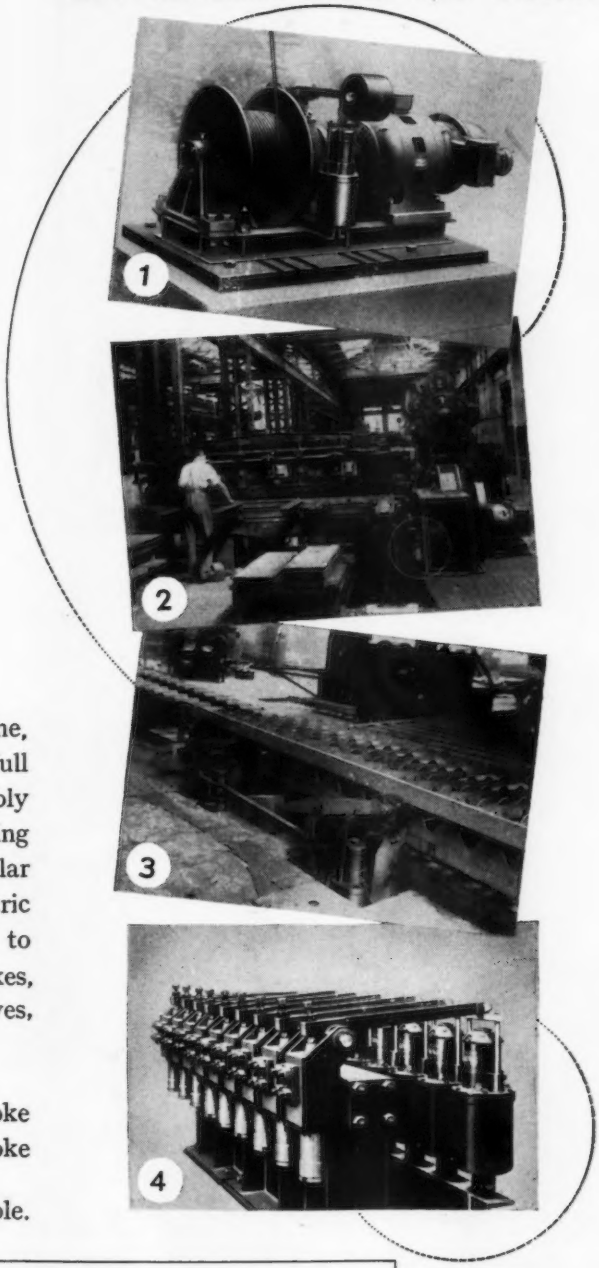

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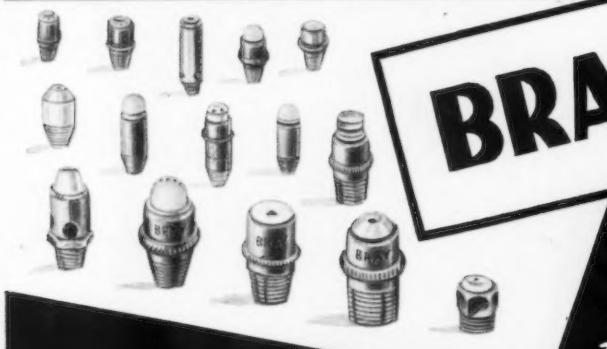

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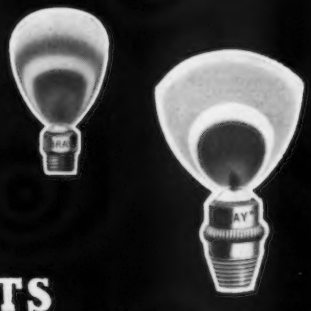

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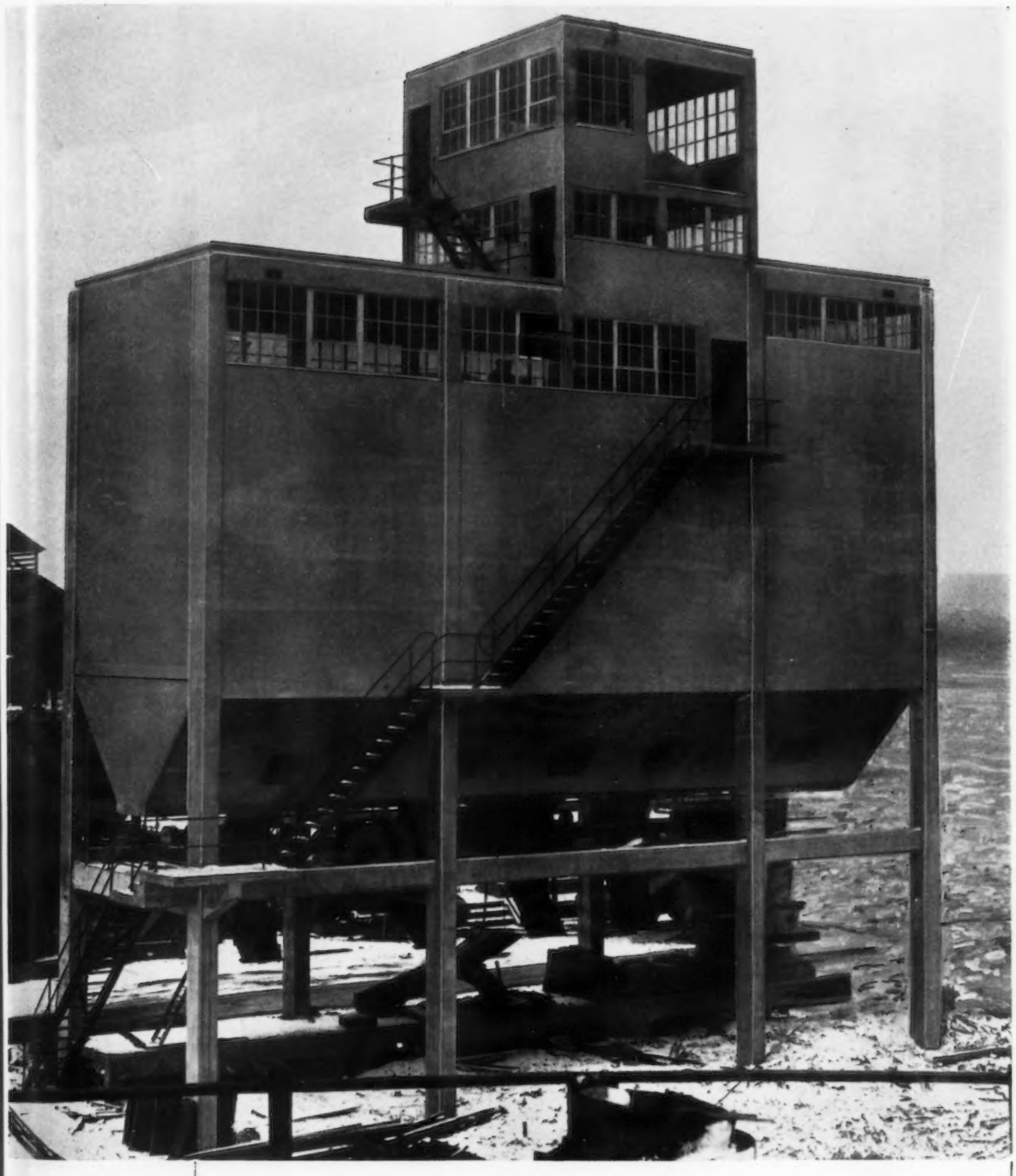

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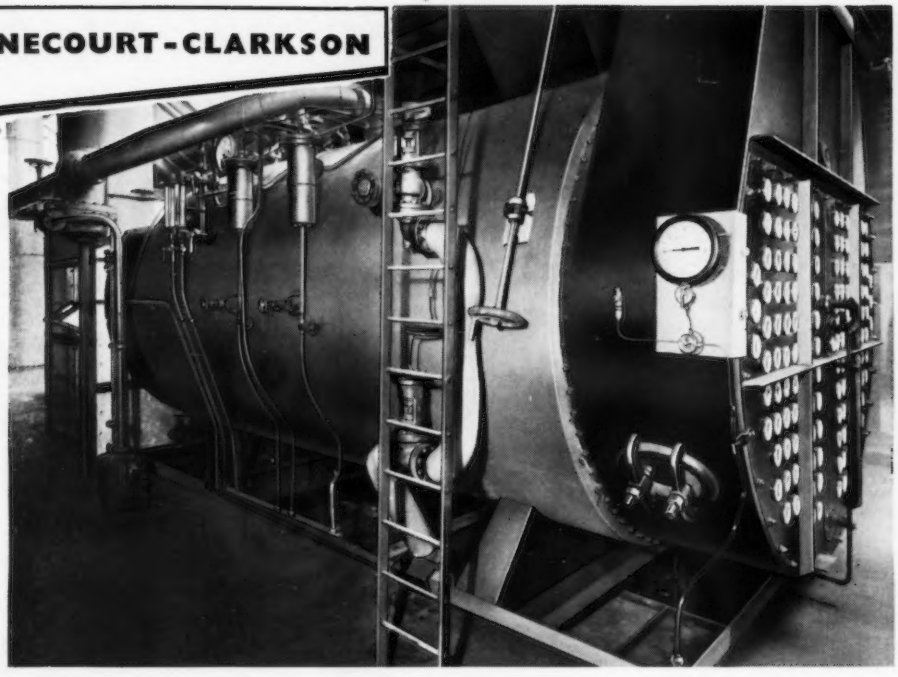

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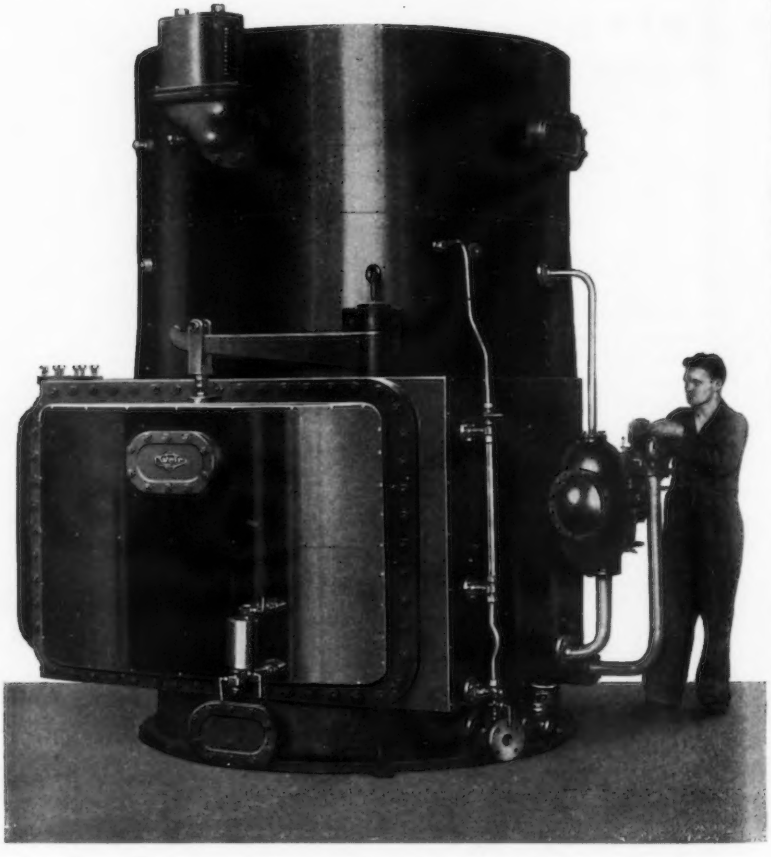

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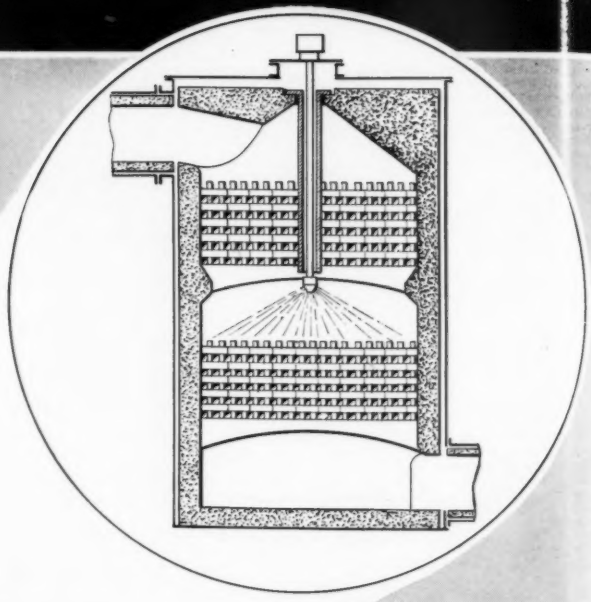

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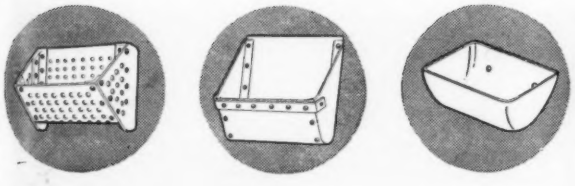

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VOL. 282 NO. 4795 APRIL 27, 1955

107TH YEAR

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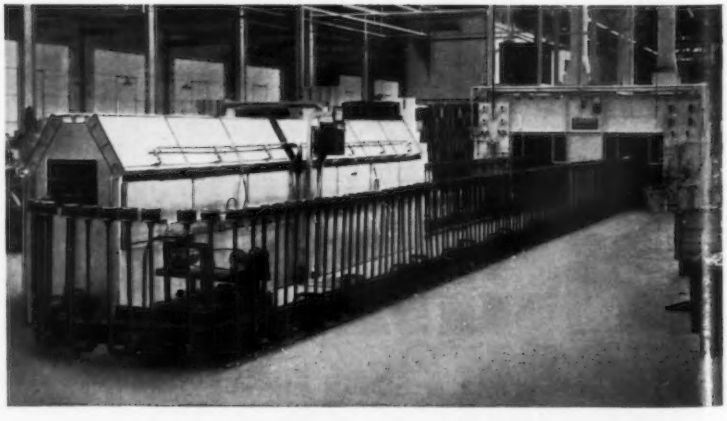

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Gas Journal

VOLUME 282. No. 4795. APRIL 27, 1955. 107th YEAR

The Two-fuel Industry

ONE of the perennial arguments among gas engineers has been and, to a certain extent still is, the question as to whether the gas industry should be a one-fuel or a two-fuel industry. The battle has been in progress for a very long time and the fortunes of war have swayed from one side to the other according to the current circumstances. On the one hand, there were those who held that the business of the gas industry was to produce and sell gas as economically and efficiently as possible and that every aspect of gas-making should contribute to this end. Alternatively, there were those who contended that both gas and coke were the natural primary products of the industry and that each had its proper place in the manufacturing techniques and in the sphere of utilization. Thus, we had those who were in favour of hazarding the whole of the industry's future on gas, and those who wanted it to provide both a solid and gaseous fuel as occasion required.

There can be little doubt that the proponents of the one-fuel theory have suffered a severe reverse as a result of the Report of the Beaver Committee on Air Pollution which clearly calls for all the coke that the gas industry can produce—and then some! Two of the articles in this issue throw an interesting light on the argument and emphasize the importance of the domestic use of coke. In our report of the proceedings of the Coal Utilization Council's convention at Eastbourne last week (p. 253) there are numerous references to coke—in fact, one is led to wonder why the Council still has the word *Coal* in its title in view of the stress on smokeless fuels for the home. The Chairman of the Solid Smokeless Fuels Federation and Deputy Chairman of the Gas Council, Mr. H. F. H. Jones, made an extremely valuable contribution to the discussion. He said, 'Dr. Hartley (Radiation Ltd.) had suggested that the progress made in appliance design justified reconsideration of the opinion of the Air Pollution Committee that domestic smoke emission could only be stopped by prohibiting the use of bituminous coal and replacing it with smokeless fuel. In making this statement he thought that Dr. Hartley had found himself in some isolation from the main concensus of scientific opinion. Certainly the Solid Smokeless Fuels Federation has seen nothing which led it to believe that the problem could be solved without a great extension in use of smokeless fuel in domestic premises. This view was supported by the last published report of the British Coal Utilization Research Association in which it was stated that the whole problem of designing efficient domestic appliances would be simplified by the use of smokeless fuels.'

It seems to us that far and away the best approach to smokelessness is the provision of a smokeless fuel, particularly where the domestic consumer is concerned, for, although certain appliances may be able to burn coal smokelessly under carefully controlled conditions, we may be pretty sure that, for a large part of the time, the householder will not, in fact, be maintaining those precise conditions. Later in his address, Mr. Jones referred to the contribution which the gas industry could make to the provision of these fuels; 'The gas industry was capable of producing more smokeless fuel provided that a larger allocation of coal was provided for its manufacture. Of recent years the industry had been limited in the tonnage of coal which it had been able to secure so that not only had coke production suffered, but of the coke made a considerable proportion (1.5 mill. tons) had to be used to make carburetted water gas. About 27 mill. tons of coal per annum had been carbonized, producing for sale about 11 mill. tons of gas coke. Within quite wide limits each additional ton of coal supplied to the gas industry would enable some three-quarters of a ton or more of coke to be placed on the market, and this coke, by replacing coal in smokeless zones, should enable still further coal to be made available for carbonization, thus again increasing the availability of gas coke for sale, possibly doubling the amount of gas coke available for the domestic market without adding to the plant construction programme of the industry. Much of the coal now being burnt in the domestic market which would thus be released would be suitable for carbonization, and the construction of additional plant would enable the process of replacing coal by coke to be extended.' From his remarks, one may conclude that, providing the necessary coal is made available, the gas industry can, in the course of time and by the installation of additional plant, produce a large part of the coke required for the implementation of the Beaver recommendations.

Another article in the present issue, 'Research on Domestic Heating at the Fuel Research Station' (p. 237), demonstrates, beyond a doubt, the fact that coke

can give a higher useful efficiency that coal when burned in an improved grate, a free-standing open fire or a stove. As the authors conclude, for free-standing and inset open fires, 'changing from coke to coal at the full rate of burning normally reduces the useful efficiency by about one quarter.' Certain stoves are able to burn coal with the same efficiency as coke but, generally speaking, the normal open fire, beloved of the British people, can give its best results with a clear, reactive coke.

Thus is coke vindicated on both counts, (1) smokeless burning and (2) highest useful efficiency in the open grate. Clearly the question as to whether the gas industry is a one-fuel or a two-fuel industry has been solved by events; coke is to have a place as significant as that of gas. This does not mean, of course, that there should be any slackening of effort in the campaign to sell more gas. On the contrary, the more coke that is produced, the more gas there will be to sell; the two can go hand-in-hand. It may well be that special plant will have to be installed to produce, as a primary product, the quantities of reactive coke needed, but this is a problem well within the technical capacity of the industry. The main thing is for all connected with the industry to recognize that its future is inextricably bound up with the *two* fuels, gas and coke, and for them to work wholeheartedly to promote the optimum production and use of both.

Morecambe Meeting

THE first financial result to be announced by any of the twelve boards was disclosed by Mr. D. P. Welman on Saturday when he addressed 600 delegates at the North Western Gas Board's Area Conference at Morecambe. In spite of increased charges amounting to £1 mill., the estimated net profit of the Board for the year 1954/55 would be £1 mill., he said. Asked why the Board wanted that surplus, Mr. Welman replied that they were determined to build up sufficient finance to meet satisfactorily a good promotional task, to reorganize tariffs, and to ensure that gas was kept on a competitive basis. Mr. Welman pointed out that there had been no increase in gas prices in the North West for the past two years, and he explained that the increased charges which had to be made were offset partly by increased revenue of more than £500,000 derived from higher prices charged for coke. The balance was absorbed by increased efficiencies.

The North Western Board has maintained its position for the sixth year in succession as the fourth cheapest in respect of prices charged for gas. Excluding those boards which take about half their gas from coke ovens, the North Western Board's price for gas is the second cheapest in the country. This is in many ways a remarkable achievement, due, we believe, not only to expert management but to the creation of an intensely real team spirit, which was easily discernible when we conversed with delegates at the conference. Referring to the Beaver Report, Mr. Welman said that if the Board were to face up to the requirements for solid smokeless fuel and meet efficiently and fully the demand as it arose, they must have coal. He anticipated they could get a larger supply than last year, and hoped to produce 200,000 tons more coke for sale. If they could be assured of a reliable and steady supply of coal, they should be in a position to offer gas at more and more competitive prices. Mr. Welman gave an interesting hint when he said: 'One thing on which I can safely say I am at least satisfied will be a very major move that cuts into the markets question and will be, I believe, the right answer to the real problem of domestic fuel.' He did not believe the industry had any need to fear competition from atomic energy at least for 20 years, and certainly not competition that they could not meet on their usage for specific purposes.

Cheerful and optimistic as the conference was, it cannot be said that the choice of papers presented was as happy in practice as it was in theory. Theoretically there were good reasons for spot-lighting industrial gas sales and the use of statistics in the gas industry. The Board's sales of gas to industrial consumers have shown an encouraging increase of 23 mill. therms a year, and at the present total of 104 mill. constitute 29% of the Board's output. With the exception of the East Midlands and West Midlands Gas Boards, the North Western Board now has the highest industrial sales in the country. With the marked success of this aspect of the Board's activities, the inclusion of a paper on 'Selling Industrial Gas,' by Mr. W. F. S. Howell, the Manchester Group Industrial Engineer, was natural and reasonable. Similarly, the way in which this Board, like other boards—and perhaps more than some—is paying greater attention to market research and the other services to be gained by statistical methods made a strong case for the inclusion of such a paper as that given by Mr. B. G. H. Clegg, Statistician to the Liverpool Group, on 'The Statistical Approach.'

The fact remains that both subjects are unquestionably of a specialized nature and one of them is in addition somewhat abstruse. In view of the large number of delegates present, including home service advisers and others at some distance removed from these matters, it was our impression that these two somewhat heavy courses provided a meal which, for some, was inclined to be indigestible. This was a pity, because in themselves both papers were admirable of their kind. However, despite what was in our opinion a slip in planning which, had it been avoided, would have resulted in the meeting being stimulated to a greater degree, the Morecambe Conference must be classed as a success and a source of inspiration to those present.

Stoke—A Smokeless Zone

AT the inauguration of the new gas-making plant at Etruria last week, Sir Harold Smith said he was given to understand that the old-fashioned bottle kiln of the Potteries, with its periodical emission of filthy black smoke, was becoming so rare that those who revel in these relics of the past had decided to take photographs of them for posterity to have some record of the 'good' old days. He was correctly informed. For some years now there has been evidence that some people have the curious notion that there was something romantic about these coal-wasters and air-polluters. This is a sort of nostalgia which can be a real obstacle to progress to cleaner, healthier conditions. It has taken the recent scourge of smog in London to frighten the romantics into a realization of

the dangers, if not the wastefulness, of the open coal fire. And still we have to accept as an axiom that for many years to come they will not abandon the beautiful, leaping, smoky flames until they are driven from them by hard economic and pathological fact.

At any rate the improvement in the atmosphere of the Potteries is already noticeable. 'A quite remarkable result,' said Sir Harold in proposing the toast of the City of Stoke-on-Trent, 'of the adoption of gas for pottery firing, is the radical improvement which is quickly noticed by visitors to the Potteries in its atmosphere, because your district was once notorious for its pall of dense, black smoke.' It is fortunate that this enhanced cleanliness, not only of atmosphere but of working conditions, is accompanied—perhaps we should say preceded—by an immense increase in thermal and operational efficiency. For the tunnel kiln must be one of the most efficient of appliances for such operations as the cyclic drying, 'burning' and cooling off of products like pottery and bricks where the pieces are more or less uniform in size and heat requirement. Uniform treatment leads to the minimum of 'wasters.' But not only has the gas used in the 300 gas-fired kilns now in operation in Stoke displaced over half a million tons of coal per annum previously consumed in the old-fashioned bottle oven; it must also have effected a considerable economy in overall coal consumption, while it has been accompanied by the production of nearly a quarter of a million tons of solid smokeless fuel to reduce the emission of smoke from domestic and other chimneys.

There is an aspect of the new plant at Etruria to which attention may be directed, although it is by now no new idea that the modern gasworks need not be an eyesore. It was probably Veillon in France who first formally called for a realization of aesthetics in the design of industrial plant. By this he does not mean a camouflage of these structures to disguise their purpose, but such a treatment of buildings and other masses as to render them pleasing and satisfactory to the eye. And this is precisely what, it will be agreed, has been achieved by the designers of the plant on the 'Wagon Repairs Site.' With regard to the buildings it was reported the other day that a visiting architect, presumably of the non-industrial school, had questioned the economy of expenditure on the improved appearance of these particular buildings. But we think that administrators in the gas industry, as in other industries, have come to the conclusion that the propaganda value alone of good appearance in manufacturing plant is considerable. There is good evidence, too, that under competent management, work is better and efficiency higher in good premises, well kept. In the gasworks, the additional cost is relatively small. In all the buildings the real strength is in the steel structure. The brickwork panelling is no thicker or more costly than it must be in any case.

The new buildings at Etruria are good in appearance, giving a satisfactory impression of dignity without meretricious ornament. There is no disharmony between them and those portions of the plant which must of necessity be left uncovered. There is nothing there but what is serving a useful purpose and this is the acid test of good design in the architecture of industrial plant.

INSTITUTION OF GAS ENGINEERS

FOLLOWING is a summary of the programme for the 92nd annual general meeting of the Institution of Gas Engineers which is to be held at Portsmouth and Southsea on May 24-27 under the Presidency of Mr. W. K. Tate, M.A., M.I.C.E., General Manager of the Eastern Division of the Southern Gas Board.

Tuesday, May 24

9.30 a.m.: Civic Welcome by the Lord Mayor of Portsmouth (Councillor G. A. Day, J.P.), South Parade Pier Pavilion. Opening of meeting. Welcome to representatives from overseas, adoption of the 92nd annual report and accounts. Presentation of medals.

10 a.m.: Presidential Address by W. K. Tate.

10.30 a.m.: Presentation and discussion of paper, 'The Architect and Industry,' by E. D. Jefferiss Mathews, O.B.E., F.R.I.B.A., A.R.I.C.S., Vice-President, R.I.B.A.

12.30 p.m.: President's luncheon, Savoy Ballroom, Southsea.

3 p.m.: Presentation and discussion of paper, 'Accelerated Continuous Carbonization. Full-scale Development and the Utilization of Low-swelling Coals,' by W. Hodkinson (Chief Technical and Planning Officer); T. Nicklin (Production Engineer), and M. Redman (Deputy Production Engineer), North Western Gas Board.

4 p.m.: Presentation and discussion of paper, 'Static Vertical Retorts at Southampton,' by H. G. Burgess (Constructional Engineer), and G. Neil (Engineer and General Manager), Southampton.

2.15 p.m.: Ladies' visit by motor coach to H.M.S. Victory and the Naval Museum, Portsmouth.

8.30 p.m.: Reception and dance, Savoy Ballroom.

Wednesday, May 25

9.15 a.m.: Presentation and discussion of paper, 'The backbone Main in the East Midlands Area,' by E. W. Pickering (Distribution Engineer, Notts and Derby Division), and J. B. Walsh (Distribution Engineer, Leicester and Northants Division), East Midlands Gas Board.

10.30 a.m.: General meeting of contributors to the Benevolent Fund.

10.45 a.m.: Presentation and discussion of paper, 'Pumping of liquids on Gasworks,' by L. J. Clark, Development Engineer, North Thames Gas Board.

Alternative afternoon visits to the Hilsea Works of the Southern Gas Board; Fawley Refinery of the Esso Petroleum Co., Ltd.; Totton Works of South Western Tar Distilleries; Eastleigh Works of Pirelli-General Cable Works; H.M. Dockyard, Portsmouth; Airspeed Division of De Havilland Aircraft Co.; Portsmouth Brewery of Brickwood and Co.; Woolston Works of John I. Thornycroft and Co., Ltd.

1.15 p.m.: Ladies' visit by motor coach to inspect the R.M.S. Queen Elizabeth.

Thursday, May 26

9.15 a.m.: Presentation and discussion of paper, 'Some Trends and Influences on the Domestic Load,' by A. V. Horsfall, Sales and Service Manager, West Midlands Gas Board.

10.15 a.m.: Persentation and discussion of paper, 'A Practical Approach to the Problems of Gas Water Heating,' by W. R. H. Lorimer, Distribution Superintendent and Sales Manager, Alnwick, Blyth Division, Northern Gas Board.

10.45 a.m.: Presentation and Discussion of paper, 'Town Gas and the Changing Needs of Industry,' by R. F. Hayman, Industrial Gas Officer, Gas Council, and E. A. K. Patrick, Watson House.

11.45 a.m.: Concluding business of meeting.

12.15 p.m.: Council luncheon to the President, Royal Beach Hotel, Southsea.

Alternative afternoon visits to the Southampton Gasworks; Loco. Works; Fawley Refinery; Tar Distilleries; Pirelli-General Cable Works; H.M. Dockyard; De Havilland; and Brickwood and Co.

2.15 p.m.: Ladies' visits by motor coach to *either* (*a*) the Portsmouth Works of Johnson and Johnson (Great Britain), Ltd.; or (*b*) the Twilfit House Works of Leethems (Twilfit), Ltd.

8 p.m.: Civic reception, theatre show and dancing.

Friday, May 27

Cruise by motor vessel and visit to East Cowes gasworks.

Personal Notes

MR. T. A. DICK, Deputy Senior Chemist at the West Midlands Gas Board area laboratories, has been promoted to Senior Chemist.

MR. R. B. BROWN, Acting Station Engineer, Ellesmere Port, North Western Gas Board, has been appointed by the West Midlands Gas Board as Deputy Works Engineer, Solihull District.

MR. NORMAN OLSEN, A.R.I.C., has been appointed Station Engineer at the Southport works of the North Western Gas Board, with MR. B. M. ASKIN as Deputy Station Engineer.

MR. J. F. JONES has been appointed by Ewart and Son, Ltd., Works Road, Letchworth, Herts, to represent them in the areas of the North Western, North Eastern, and Northern Gas Boards.

MR. LAWRENCE FARQUHAR, who has retired from the post of Gas Manager at Peebles, has received a cheque from Peebles Town Council in appreciation of his services. Mr. Farquhar held the post for 30 years before being taken over with the gasworks by the Scottish Gas Board.

MR. B. O'DONNELL, Busby, near Glasgow, has been appointed District Manager at Kirkcudbright. During his 14 years at Busby he has taken a keen interest in local affairs, and is at present district councillor in the First District of Renfrew. Some years ago he formed the Busby Old Folks' Friendship Club, took over the secretaryship and steered the club into a sound financial position.

MR. W. HEAPS, the oldest employee of Hopkinsons, Ltd., Huddersfield, celebrated his 80th birthday on April 22 and was the recipient of gifts from his colleagues and also from inspectors of various boiler insurance companies. Mr. Heaps, who has been with the firm over 53 years, is in charge of the department concerned with final inspection of outgoing equipment.

MR. W. SUTCLIFFE, General Manager of the Blyth Division of the Northern Gas Board, who has been appointed General Manager of the Tyneside Division, was congratulated on his appointment by Alderman N. Garrow, Chairman of the Blyth Divisional Consumers' Committee, at a recent meeting. Alderman Garrow paid tribute to the work done by Mr. Sutcliffe since nationalisation in the Blyth Division and wished him well in his new work. Mr. Sutcliffe thanked the Committee for its good wishes.

SIR GRAHAM HAYMAN has been elected President of the Federation of British Industries in succession to SIR HARRY PILKINGTON, who has held office for two years. Sir Graham is a Director of the Distillers Company and Chairman of its management committee, Chairman of the British Tyre and Rubber Co. and on the boards of a large number of other companies. He is a Vice-President and former Chairman of the Association of British Chemical Manufacturers.

MR. ERIC NEWBIGGING, in joining the Parkinson Stove Company as Lecturer, continues a century-old family tradition of service in the gas industry. His great grandfather, Dr. Thomas Newbigging (author of Newbigging's Handbook for Gas Engineers) was a well known character of the gas industry during the years preceding the first world war. Eric Newbigging's grandfather, John Newbigging, was Chief Engineer to the Manchester Corporation Gas Department from 1900 to 1916. His own father was associated with the Colonial Gas Company in Melbourne until ill-health forced him to retire.

Obituary

MR. FRED SMITH, formerly Manager of the Garforth undertaking, one of the West Riding Group prior to nationalisation, has died at Garforth.

MR. ERIC J. BOSTON, Deputy Chairman of Scottish Tar Distillers, Ltd., died on April 7. Mr. Boston joined the Company as Chief Accountant in 1932, was elected to the Board in 1937, and was appointed Deputy Chairman in 1954. He was also a Director of Richard Smith, Ltd., Chemical Manufacturers, Glasgow.

MR. NORMAN B. THOMPSON, who was Engineer and Manager of the Skipton U.D.C. Gas Department from 1928 to 1936, has died at his home at Harrogate. He had also held similar posts at Ormskirk and Hyde. At Skipton he was mainly responsible for the erection of a zeppelin-shaped high pressure holder, one of the earliest of its type in the north of England.

Dempster Centenary.—As part of the centenary celebrations of Robert Dempster & Sons, Ltd., Elland, employees and their wives were taken in 16 motor coaches for a trip to Blackpool as guests of the firm on April 23. Retired long service employees were included in the party, which totalled about 600, for whom a civic welcome had been arranged at Blackpool.

John Harper & Co., Ltd., held their British Industries Fair preview on April 22 at their London Office in Seaforth Place. Although they are showing no new products this year, there were several gas appliances, notably their well-known radiators for town and bottled gas, their heated towel rail, griller hot plates also for town and bottled gas, and a wide selection of portable fires in a variety of colours.

Diary

April 28.—NORTH THAMES G.C.C.: Caxton Hall, Westminster, 2.30 p.m.

April 28-29.—WALES AND MONMOUTHSHIRE SECTION, I.G.E.: Spring Meeting, Tenby.

April 28-30.—EAST MIDLANDS GAS BOARD: Staff Conference, Skegness.

April 29.—LONDON JUNIORS: 'Subjective Response and Environment,' F. C. Smith. 178, Edgware Road, London, W.2. 6.30 p.m.

April 29.—MANCHESTER AND DISTRICT SECTION, I.G.E.: Fifth Annual General Meeting, Grand Hotel, Aytoun Street, Manchester, 2.30 p.m., preceded by luncheon, 12.30 for 1 p.m.

April 30.—WESTERN JUNIORS: Annual General Meeting and visit to works, Weston-Super-Mare.

May 3.—EAST MIDLANDS G.C.C.: George Hotel, Grantham, 11.30 a.m.

May 3.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, 11 a.m.

May 3-6.—WOMEN'S GAS FEDERATION.—Conference, Eastbourne.

May 5.—NORTH OF ENGLAND SECTION, I.G.E.: Fourth Annual General Meeting, Old Assembly Rooms, Newcastle-upon-Tyne.

May 6-7.—BRITISH GAS STAFF ASSOCIATION: Annual Conference Blackpool.

May 6-7.—SCOTTISH JUNIORS (WESTERN DISTRICT): Visit to Begwaco Meters, Ltd., Farnworth, Lancs., and to Partington Works of the North Western Gas Board.

May 7.—EASTERN JUNIORS: Annual General Meeting. Afternoon visit, ladies invited. Luton.

May 7.—MIDLAND JUNIORS: Jubilee Dinner.

May 7.—SCOTTISH JUNIORS (EASTERN): Annual General Meeting, Kirkcaldy. Morning visit to Tully plant.

May 11.—SOUTH WESTERN SECTION, I.G.E.: Documentary Film: 'Pipeline Construction,' by William Press & Son, Ltd., Exeter.

May 11.—YORKSHIRE JUNIORS: President's Day. Visit to Robert Dempster & Son, Ltd.

May 14.—WALES AND MON. JUNIORS (SOUTH): Joint Meeting with Western Juniors. Address by Mr. Gerald Nabarro, M.P. Cardiff.

May 14.—LONDON JUNIORS: Visit to Portslade works, Brighton.

May 16.—WEST MIDLANDS G.C.C.: Gas Offices, Edmund Street, Birmingham. 2.30 p.m.

May 16.—EASTERN G.C.C.: Connaught Rooms, Great Queen Street, Kingsway, W.C.2. 2 p.m.

May 17.—LONDON AND SOUTHERN SECTION, I.G.E.: Spring Meeting. Annual Luncheon and Chairman's address.

May 18.—MANCHESTER JUNIORS: Visit to A. V. Roe & Co., Ltd., Woodford Works. 'Complete Gasification', Hartill, Spencer, and Wheatman.

A view of the control room on the first floor of the calorimeter building.

*Research on Domestic Heating at the Fuel Research Station**

By J. W. McHugo,† W. F. B. Shaw,† and D. Whittaker†

THE calorimeter building at the Fuel Research Station, Greenwich, was designed during the latter part of the 1939-45 war period to meet the expected post-war requirements for research on domestic heating. It was erected after the war and officially opened in June, 1948, since when it has been developed and more fully equipped as the result of experience. It was built to enable a more detailed study to be made of the distribution of heat from solid-fuel-burning appliances than is possible with existing methods and facilities and it contains four 'cabinets' each roughly the size of a small room, so that effects which would arise in practice from the enclosure of the appliance within a room may be investigated. In later paragraphs a brief description of the cabinets and building is given and this is followed by a report on some of the work carried out in them.

Design and Layout of the Calorimeter Cabinets

When fuel is consumed in a heating appliance part of the heat available from the fuel is lost as sensible, latent, and potential heat in the flue gases and as unburnt fragments of fuel in the ashpit, while the remainder appears as heat output. Most of the heat output from an appliance operated inside one of the calorimeter cabinets eventually passes through the walls, floor or ceiling; the remainder is utilized in raising the temperature of the air which flows through the cabinet and enters the appliance. The air-warming can be determined from the flow rate and the temperature-rise of the air; the heat flow through the walls, floor and ceiling is determined from the temperature-differences between the inside and outside surfaces, which are measured by a large number of differential thermocouples.

Each of the cabinets is 12 ft. square and 9 ft. high. It is constructed of Plymax, a commercially-available material consisting of ¼ in. plywood faced on both sides with sectioned copper sheeting; the differential thermocouples are soldered to this sheeting (Fig 1). Each cabinet is mounted inside a large chamber through which air is circulated. This air is automatically controlled for temperature; it absorbs the heat leaving the outer surfaces of the cabinet and maintains these surfaces under controlled conditions.

The construction of the cabinet is such as to make it sensibly air-tight, so that all the air entering it is obliged to pass through an inlet duct and can be metered. The inlet air is fan-driven and its flow rate is automatically controlled so as to keep the air pressure inside the cabinet at a fixed value relative to atmospheric pressure (normally equal to the atmospheric value).

The four cabinets, each enclosed within its controlled-temperature chamber, are situated in the building with the cabinets on the first-floor level; the outer chambers extend from ground level to the ceiling of the second floor. The chimneys from the cabinets pass through to the third floor, where they are fitted with smoke-measuring equipment. The vertical layout of the building can be seen from the photograph in Fig 2 of a scale model, which displays the north-west face of the building with an 'opened-up' view of the north cabinet.

Most of the individual measurements connected with the use of the cabinets are recorded automatically. The recording

* From a paper presented to the Institute of Fuel in London on March 24, 1955.
† Fuel Research Station, Department of Scientific and Industrial Research.
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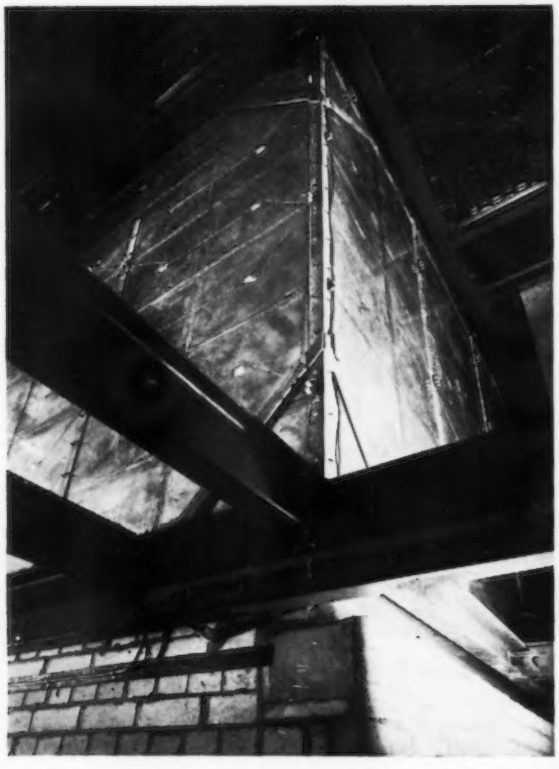

Fig. 1. Exterior of one of the calorimeter cabinets showing thermocouples.

instruments and the controls for the plant associated with cabinet operation are placed in the control room on the first floor (titleblock).

The flues of two of the cabinets enter near the centre of the ceiling while the flues of the other two are nearer to the side. Because of the interest during the last two or three years in what has been termed the 'room-heating efficiency' of appliances, it was considered desirable that facilties should exist for making a cabinet measurement of the output of an appliance and its chimney setting. Brick settings have therefore been erected in the two cabinets with side flues; each is built on a concrete hearth placed on the cabinet floor girders (which required some strengthening) and connects with the cabinet flue; they were designed to conform as far as possible in materials and dimensions with standard practice for house chimneys. One of these settings is shown in Fig. 3.

The general procedure at present is that entirely free-standing appliances such as stoves are installed in the central-flue cabinets, with a lagged flue-pipe connection from the appliance to the permanent flue; appliances whose performance is likely to be significantly affected by the setting, such as open fires, are installed in the side-flue cabinets with the brick setting. These arrangements can be varied to suit particular requirements.

The warming-up characteristics of the cabinets are such that it is possible to obtain a test period of at least six hours during the day, provided that the fire has been lighted early in the morning. The usual procedure is that the plant is closed down for the week-end, serviced on Monday morning, and started up on Monday afternoon, so that stable chamber conditions have been obtained by Tuesday morning. Results can be obtained from the central-flue cabinets on Tuesdays, but it has been observed that the brick settings in the side-flue cabinets take up to 48 hours to attain equilibrium; the procedure in this case is to light the fire on Monday afternoon and then operate it continuously (banking at nights), the first reliable results being produced on Wednesday.

The technique for the operation of the appliance is made to conform as closely as possible to that laid down in the Ministry of Fuel and Power 'Standards and Methods of Test for Domestic Solid-fuel Appliances.' This covers such questions as the fuels to be used, methods of refuelling, and periods between refuels, etc.

It has been shown that the calorimeter cabinets, when used in the way for which they were designed, offer a method for determining the overall space-heating output of an appliance and of assessing its total air consumption. Under the favourable conditions obtaining during a gas-fire test it has been possible to come within 1% of a heat balance.

SOME EXPERIMENTAL RESULTS

It is a matter of experience that measurements made in connection with solid-fuel-burning appliances are subject to a degree of variability in repeat experiments made under nominally identical conditions. When the influence of a particular variable on the performance of an appliance is being studied it is consequently necessary for a sufficient number of repeat measurements to be made for the result to be statistically significant.

For much of the experimental work in the calorimeter building it has been the practice to devote at least one working week to the investigation of a particular combination of conditions, the measured result being derived from experiments made during the course of the last three or four days of each week. It is easy to see, therefore, that fully to investigate and establish the existence of any particular phenomenon may require a long period of experiment. In view of the breadth of the new research field which was opened up by the availability of the calorimeter building and its facilities it has not been thought proper to concentrate on any particular problem of the many awaiting investigation, nor indeed would it have been an easy matter to decide the appropriate order of priority. Instead the policy has been to make a survey over the whole field, carrying each particular experiment just far enough to establish the broad trends of behaviour to a reasonable degree of certainty. The various investigations are being resumed in turn, as opportunity permits, and studied in more detail.

The purpose of the present review is to place on record a brief outline of the work which has so far been done, and of

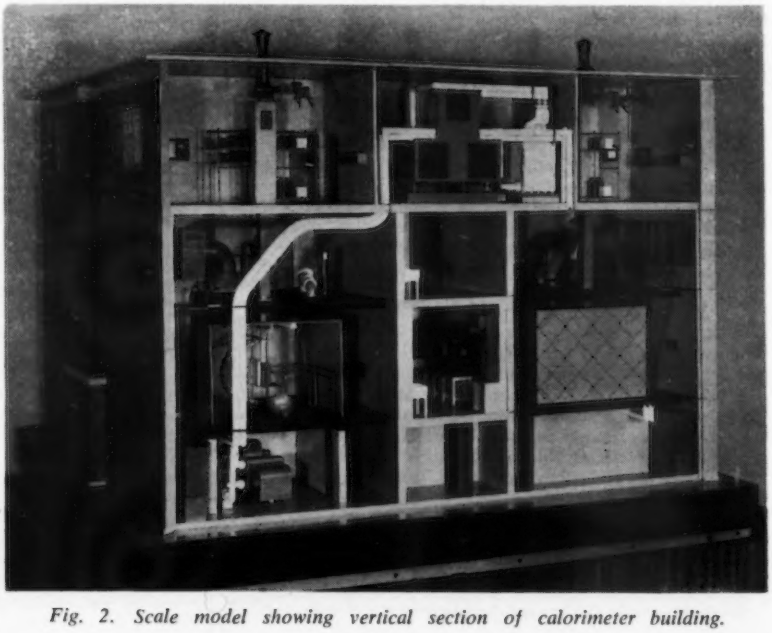

Fig. 2. Scale model showing vertical section of calorimeter building.

the trends which are emerging, in order that this information may be available for study without undue delay.

Certain of the experimental conditions were common to a number of the investigations, and may conveniently be summarized at the outset. For all the work on inset and free-standing open fires the special brick chimney setting in the west cabinet, already described, has been used. A refractory fireback in accordance with B.S. 1251:1945 has been installed therein with a backing of builder's rubble, the resulting fireplace being as nearly as possible in conformity with Fig. 1 of Code of Practice C.P. 403 (1952). A simple form of tiled surround completes the installation.

The work on stoves was done in cabinets without a brick chimney. Here the flue outlet of the appliance was connected to the cabinet flue by means of a length of pipe which was insulated with a layer of 1 in. asbestos rope. The fuels used were of the types and sizes specified for the official testing procedure. The coal is Gedling Top Hards, washed trebles, sized 2½-1¼ in. round holes and sieved over 1¼ in. square holes before use. The gas coke is a horizontal retort-coke made from Durham Hards, supplied from the Nine Elms works of the North Thames Gas Board, either as No. 2 size (2-1 in. square holes) or No. 3 size (1¼-½ in. square holes). In all cases the cabinet air-control mechanism was set to maintain the pressure inside the cabinet at atmospheric value.

Efficiency Measurements on Open Fires

Inset 'Improved' Fire.

A 16 in. open fire 'A' of conventional design, without boiler or convection, selected from those included in Category 2 (*b*) of the Coal Utilization Council's list of Recommended Domestic Solid-fuel Appliances, was installed in the fireplace already described. Coke-burning open grates of this type are known by the generic title of 'improved grates.' It was then operated under various conditions and the useful output efficiency (i.e., that corresponding to the total heat output into the cabinet from the appliance and the chimney breast) and the induced chimney air-flow were measured.

Measurements were made with both coal and No. 2 size gas coke, each fuel being burnt at two rates, the greater of these representing the full rate for the appliance and being obtained with the primary air control fully open. The experiments were repeated with a commercial design of chimney throat restrictor fitted in the throat of the setting, and adjusted so as to reduce the area of the throat aperture to approximately 6 sq. in. The results obtained are summarized in Table I.

TABLE I.—USEFUL EFFICIENCY MEASUREMENTS WITH INSET OPEN FIRES OF THE IMPROVED AND STOOL-BOTTOM TYPES

Grate	Throat restrictor	Fuel	Rate of burning, lb. per hr.	Air-flow rate, cu. ft. per hour	Useful efficiency, %
Improved Type "A"	No	Coal	4.0	13,500	25.0
	No	Coal	2.3	10,700	30.4
	No	Coke	2.5	12,500	35.0
	No	Coke	1.35	10,400	36.4
	Yes	Coal	3.8	4,600	30.8
	Yes	Coal	2.15	3,300	34.6
	Yes	Coke	2.4	4,400	39.3
Stool-bottom Type "B" ..	No	Coal	3.2	11,000	27.4
	Yes	Coal	3.25	4,200	33.4

For comparative purposes the same installation—*i.e.*, a rubble-insulated fireback, tiled surround and inset fire 'A,' was built into one of the standard 15 ft. chimneys of the form specified for official type-testing. Here, in the open laboratory, the appliance was subjected to as nearly as possible the same set of operating conditions as in the cabinet, and the hemispherical radiation efficiency measured. The results obtained are given in Table II.

Comparison of the figures in the two tables reveals the interesting fact that, while the radiation efficiency is not greatly affected by either the rate of burning or the rate of chimney air-flow, the overall useful efficiency, including the contribution from the brickwork of the chimney, is markedly dependent upon both these factors, especially with coal. It is known from the earlier work of Dill, Achenbach and Duck that, for flue gases of the same sensible heat content, the heat returned to the room from the brickwork is increased by a reduction in flue-gas flow rate. The reason for the considerable influence of the burning rate is not clear, nor does such information as is at present available as to the distribution of heat losses throw any light on the matter.

TABLE II.—RADIATION EFFICIENCY MEASUREMENTS WITH AN IMPROVED TYPE OF INSET OPEN FIRE

Throat restrictor	Fuel	Rate of burning, lb. per hour	Radiation efficiency, %
No	Coal	4.6	24.1
No	Coal	2.65	25.0
No	Coke	2.9	34.5
No	Coke	1.4	34.2
Yes	Coal	5.0	25.9
Yes	Coal	2.95	25.9
Yes	Coke	2.65	36.2
Yes	Coke	1.5	37.4

Fig. 3. Fireplace, etc., inside a calorimeter cabinet.

The Stool-bottom Grate.

A model of the pre-war type of stool-bottom grate 'B' with front fret has also been tested when installed in the west cabinet setting, both with and without the chimney throat restrictor. The measurements were made with coal at the full rate only, since this type of grate does not burn gas coke and provides little facility for the control of burning rate. The results obtained have been included in Table I and show that the grate has a somewhat higher overall efficiency than the 'improved' type of grate when compared at their respective full rates of burning. No doubt this phenomenon is due, at least in part, to the lower maximum burning rate of the stool-bottom grate.

Free-standing Open Fires.

The report of the Ridley Committee in 1952 recommended that a new type of heating appliance should be developed to fulfil three main requirements: it should provide convection in addition to radiation, it should incorporate an adjustable throat restrictor, and it should be suitable for ready installation in front of existing firebacks. Several commercial designs

to meet this specification, the majority of them free-standing fires but including one double-cased convector unit, have been tested in the calorimeter building. For the purposes of the present discussion they will all be regarded as free-standing units.

For the test they were installed in front of the fireback in the setting of the west cabinet and coupled, by the means provided by the manufacturer, to the brick chimney. In general, time permitted experiments to be carried out over only a narrow range of operating conditions, which did not include variations of burning rate and included variation of the restrictor setting for one appliance only. The results obtained are summarized in Table III.

TABLE III.—USEFUL EFFICIENCY MEASUREMENTS WITH FREE-STANDING OPEN FIRES

Appliance	Throat restrictor	Fuel	Rate of burning, lb. per hour	Air-flow rate, cu. ft. per hr.	Useful efficiency, %
C	Closed	Coal	2.2	2,900	32.2
	Open	Coal	2.4	5,700	27.2
D	Closed	Coal	3.0	2,650	33.4
	Closed	Coke	1.6	2,300	44.8
E	Closed	Coal	1.95	3,800	30.8
	Closed	Coke	1.2	3,700	41.8
F	Closed	Coal	2.7	3,700	32.3
	Closed	Coke	1.8	3,600	41.6

Efficiency Measurements on Stoves

Closed Stoves

Closed stoves in general depend little upon high-temperature radiation from the fuel bed, but give their space-heating in the form of convection and of low-temperature radiation from the whole body of the stove. There can consequently be no question of measuring the thermal efficiency of closed stoves by the conventional method used for openable stoves.

This measurement can, however, be made quite easily when a closed stove is installed in a calorimeter cabinet, when the total useful efficiency is determined with the appliance exposed to the ambient air and used as nearly as possible as it would be in the home. Several designs of closed stoves have been studied when installed in this way. Quite wide variations in efficiency have been observed; some of the values obtained are listed and discussed later on.

Openable Stoves

The conventional method of testing the thermal efficiency of a free-standing openable stove is to remove its outer casing and install it in an insulated sheet-metal convection box enclosing an air space 2 to 3 in. wide around the back, sides and top of the stove. The heat output is then measured as the sum of the convected heat produced in this stylized form of convection space, and of the radiation emerging through the front opening of the stove. This procedure at the same time disturbs the normal relationship between the stove and the ambient air, and takes no cognizance of the contribution of convection heat from the front surfaces of the appliance, which is likely to be substantial, especially when the fire-doors are closed. Fig. 4 shows a typical openable stove undergoing test in one of the calorimeter cabinets.

The facilities of a calorimeter cabinet consequently afford a method by which the total useful efficiency may be measured when the appliance is installed in the free-standing state in which it would be in the home. Such a test would be expected to be very much more realistic in every way than the conventional procedure. To demonstrate the order of difference in the results likely to be given by the two test methods, one particular design of openable stove 'G' (without boiler) in Table IV, was tested in both ways when burning No. 2 size gas coke. When the stove was enclosed in the convection box the average efficiencies were 43% with the fire-doors open, and 45% with them closed. In the cabinet the corresponding efficiencies were 59% and 72%; these latter figures include a contribution from a lagged flue pipe within the cabinet, which was not separately measured but is estimated to be of the order of 5%.

These figures emphasize the wide divergence between the results yielded by the two methods, specially when the stove is operated in a closed condition. The opportunity is being taken during the process of retesting existing recommended appliances, under the new test procedure which came into force in 1953, to carry out a similar comparison for a large number of stoves.

Overall Efficiency of Small Domestic Hot-water Boilers

Small, uninsulated boilers, usually of the horse-shoe type with openable front, are widely used to supply domestic hot water, and are frequently installed in rooms which serve as living space for some part of the day. There are therefore circumstances in which the space-heating which is derived from the outer surfaces of the boiler represents a useful amount.

To investigate the possible magnitude of this secondary heating effect a typical boiler of this class, with 2 sq. ft. heating surface, was installed in one of the cabinets. The water-heating efficiency was measured by the conventional continuous-flow, temperature-rise method, while the space-heating was measured by the cabinet facilities. For this particular investigation the first 3 ft. of the 4 in. flue pipe was left unlagged, in an attempt to simulate conditions typical of those in many domestic installations. Four experiments were carried out, all at fairly high rates of burning (corresponding to hot-water outputs between 14,000 and 18,000 B.Th.U. per hour). The average for the four tests gave a water-heating efficiency of 49% and a space-heating efficiency, including that from the unlagged section of flue, of 20%. There were clear indications that both efficiencies were increasing with reduction in rate of burning. Thus, within the limitations of all dual-purpose appliances, the small domestic hot-water boiler is seen to have quite a high overall efficiency.

Distribution of Heat Losses

Some examples of heat-distribution data are given in Table IV (improved open fire and free-standing open fires) and Table V (closed and openable stoves). As the measurements were made at different times and as parts of different experiments, all the components were not measured in all cases. For example, the ashpit loss was determined in two cases only, where it was 0.5% or less; for the present purpose this loss has been included in the 'remainder' column, which therefore comprises the sum of potential and latent heat losses in the flue gases, and ashpit loss and any errors of determina-

(*Continued on p. 251*)

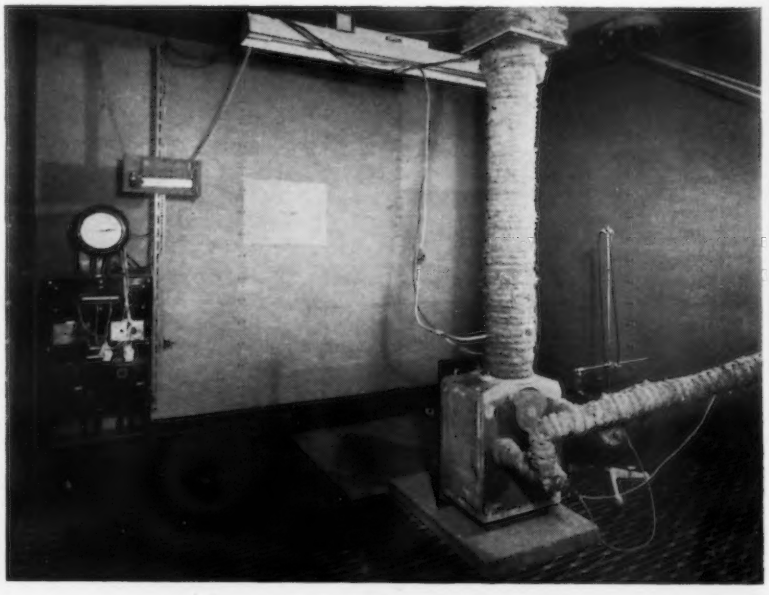

Fig. 4. Openable stove in central-flue calorimeter cabinet for testing.

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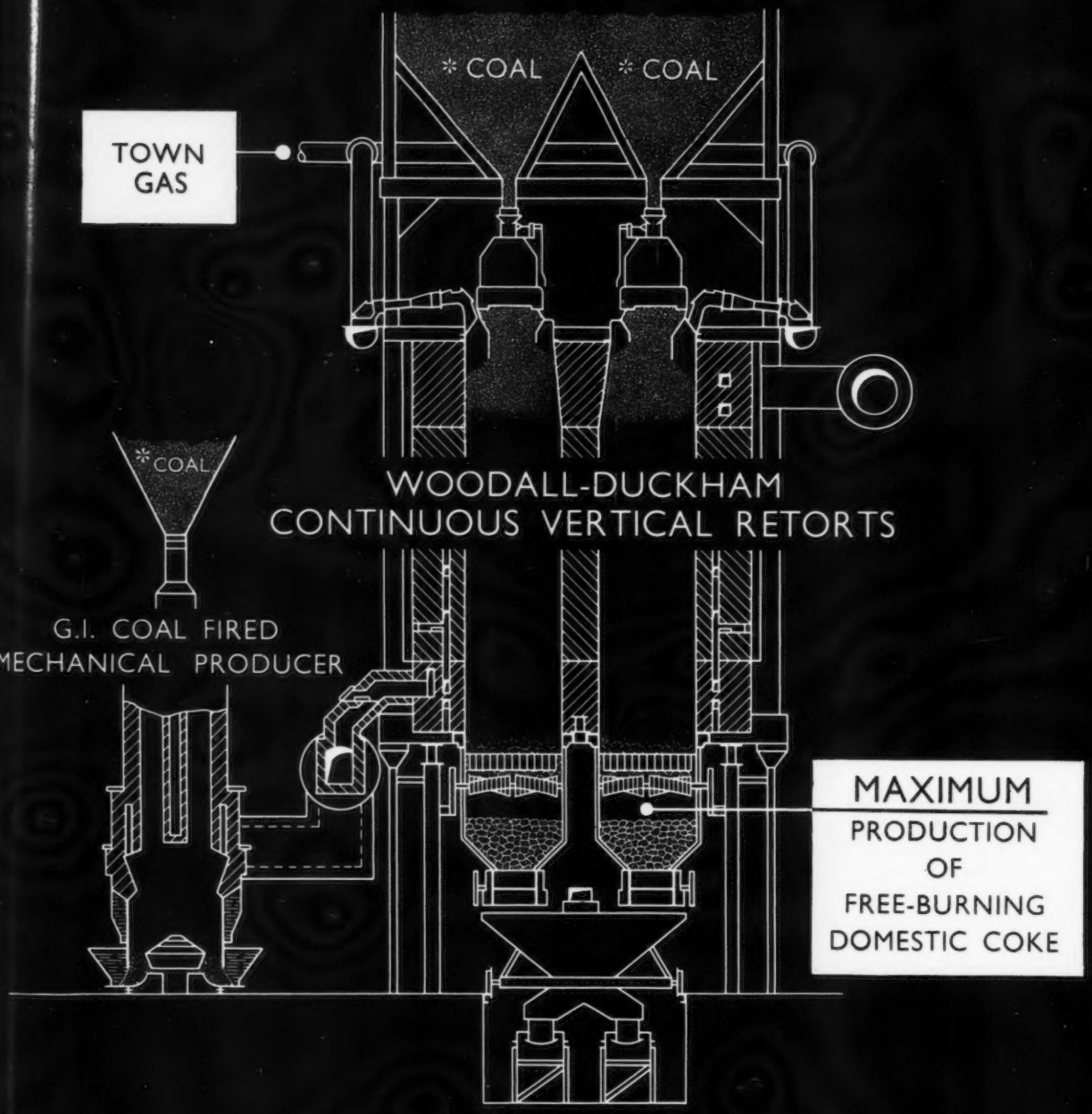

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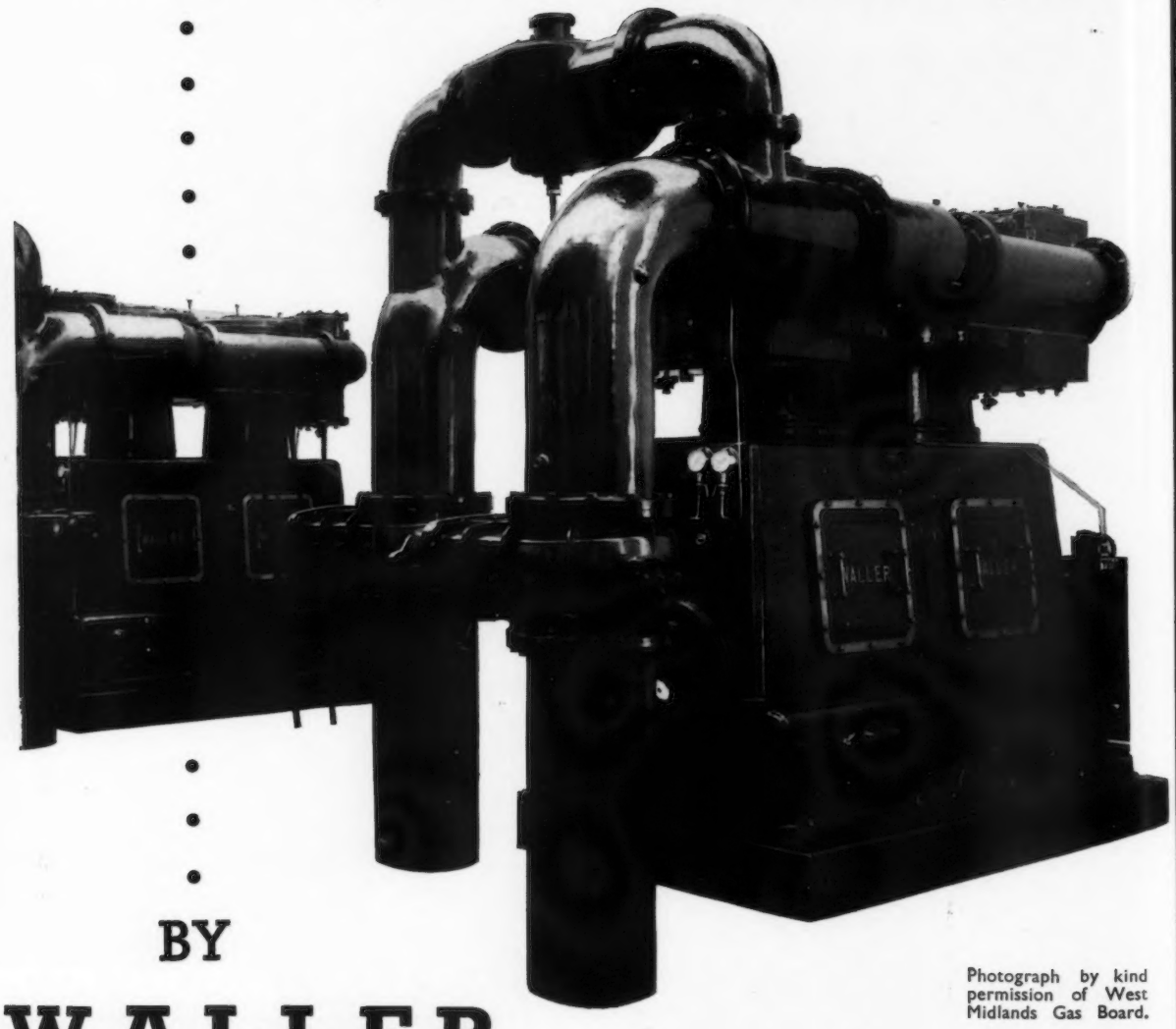

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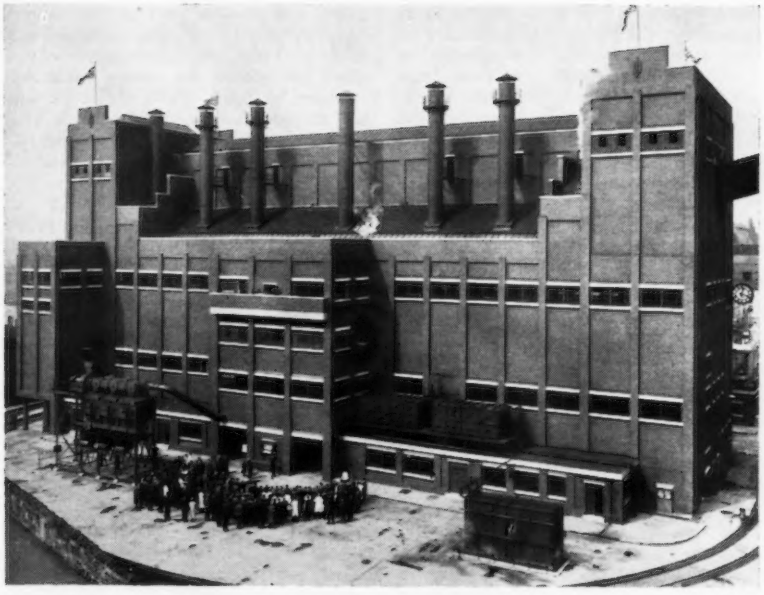
NEW PLANT AT ETRURIA GASWORKS

★

Inauguration Ceremony by Sir Harold Smith on April 20



A bird's-eye view of the inauguration ceremony.

ON Wednesday, April 20, in glorious spring weather, the Etruria gasworks of the North Staffs. Division of the West Midlands Gas Board was the scene of a pleasant ceremony. In last week's 'JOURNAL,' we described the new plant which has recently been installed at Etruria gasworks to meet the ever-increasing demands for gas by the pottery industry in this area, and it was, of course, this additional plant which was inaugurated by Sir Harold Smith during the ceremony to which we have referred.

During the morning, a large gathering of notable people from various departments of the fuel industries and from local civil life assembled at Etruria works to be welcomed by Mr. G. le B. Diamond, Chairman of the West Midlands Gas Board, and his staff. A short tour of the new plant was arranged for the visitors, the first party consisting of the Lord Mayor of Stoke-on-Trent (Alderman Mrs. A. L. Barker, J.P.), the Lady Mayoress (Alderman Mrs. Meakin), Sir Harold Smith, Mr. G. le B. Diamond, Mr. W. R. Branson (Deputy Chairman, West Midlands Gas Board), Mr. J. E. Stanier (General Manager, North Staffs. Division, West Midlands Gas Board), together with other leading personalities. It was clear that all those who had the privilege of viewing the new plant were most impressed by the quality of the workmanship which had gone into it, both in design and erection.

Designers' Ingenuity

From our description in last week's issue, our readers will have been able to form an idea of the ingenuity which was required of the designers of the plant to fit what is, to all intents and purposes, a new works of 8 mill. cu.ft. of gas producing capacity into a site area of only 4.8 acres, and still to present a spacious lay-out with all the amenities required.

Sir Harold Smith unveiling the commemorative plaque.

After the tour of the works, in the course of which most of our pictures were taken, the visitors assembled at the new Glover-West retort house for the unveiling of a memorial plaque placed in the wall of the house to commemorate the present occasion. The ceremony of unveiling was performed by Sir Harold Smith who paid tribute to all those who had had anything to do with the planning and construction work; he also wished good luck to the men who were going to operate the plant.

The guests of the Board then adjourned for luncheon to the Town Hall where a magnificent display of civic plate and china left no doubt in their minds as to the locality in which they were being entertained. Rarely can such a splendid collection of exquisite china have been assembled for such a function and it was only right and proper that the City of Stoke-on-Trent should take pride in it.

Hygienic Conditions

In his speech after the luncheon, Sir Harold Smith referred to the contribution which the gas industry is making to the success of the efforts of the pottery industry. He said, 'A quite remarkable result of the adoption of gas for pottery firing is the radical improvement which is quickly noticed by visitors to the Potteries in its atmosphere, because your district was once notorious for its pall of dense black smoke. Nowadays, many of your factories have been modernized or reconstructed so drastically that they are models of efficiency and cleanliness, and the health of the operatives must have benefited enormously from the more hygienic conditions under which they now work.

Continued Sir Harold: 'There are now 300 gas fired kilns in operation in your city, which have displaced over half a million tons of coal per annum previously consumed in the old-fashioned bottle ovens. I understand that these are now becoming so rare that you have

decided to take their photographs so as to preserve for posterity some record of past days. However, the appetite of your local industry for gas is far from satisfied, and demands are again beginning to outstrip supplies, although the West Midlands Gas Board had envisaged that the large new plant which I have had the pleasure of inaugurating today would cater for the growing demands up to 1958. Such is the prosperity of the pottery industry that this new plant is already in full production and, like Oliver Twist, you are asking for more.

'Mr. Diamond and his Board and Mr. Stanier, the General Manager of the North Staffordshire Division of the Board, who is well-known to you, are fully aware of the need for more gas-making plant, and another part of the country has been robbed so that, all being well, Stoke-on-Trent may have another new plant installed by the coming winter. It is hoped by these measures to cope with the extraordinary demands which your local industry is making on the Board.'

Should Feel Proud

Sir Harold went on: 'The City of Stoke-on-Trent should feel very proud of its gas undertaking, which was progressively developed by the British Gas Light Company and then by the Corporation until it passed into the ownership of the West Midlands Gas Board in 1949. Its history of expansion and efficient management make it one of the most notable undertakings in the country. The remarkable increase of 50% in gas output recorded by the undertaking since nationalisation, is outstanding.'

J. E. Stanier, O.B.E., G.M., *General Manager, North Staffs. Division.*

The main party pauses to view the retort house. In our picture can be seen: Mr. Stanier (extreme left), Sir Harold Smith, the Lord Mayor of Stoke-on-Trent, the Lady Mayoress, and Mr. G. le B. Diamond (extreme right).

The visitors assemble outside the Glover-West retort house for the inauguration.

Sir Harold spoke for a while of the City's other attributes; its other industries, its famous literary and other celebrities. The City, he said, could justly be proud of its housing record since the war. 'I believe its rate of building new corporation houses is higher than in any other city in the country,' he said. 'This, of course, has its repercussions on the gas industry. The North Staffordshire Division has laid more new services this year than any other division in the West Midlands Area.'

'Following upon the modernization of the pottery industry, such an enlightened policy on the part of your corporation must surely lead to greatly improved health and well-being in your citizens.

'Stoke-on-Trent is well to the fore in education,' added Sir Harold. 'The educational world is watching, with great interest, the development of the University College of North Staffordshire, in the historic Keele Hall. This is the only post-war university in the country. Your City also has some outstanding modern school buildings, the latest being the new Hanley High School, opened in 1953 at a cost of £340,000.' He also mentioned the North Staffordshire Technical College, which had played such an important part in all fields of technical education.

Speeches were also made by Mr. G. le B. Diamond, the Lord Mayor of Stoke-on-Trent, and Mr. E. James Johnson, J.P., Deputy President of the North Staffordshire Chamber of Commerce. Mr. Diamond made particular reference to the invaluable work of Mr. J. E. Stanier, Divisional General Manager of the North Staffs. Division, to whose efforts much of the success of gas in the Potteries is due. He also mentioned that no less than £20 mill. had been spent by the West Midlands Board since vesting day on capital outlay and that, in consequence, the burden of interest and depreciation has now become very great. In view of these facts, he doubted whether the consumers could, for long, enjoy the present price of gas which, he recalled, was at present the third lowest in the whole of the country.

An Administrative Approach to Technical Efficiency*

By D. C. ELGIN, Edinburgh

ALTHOUGH gas manufacture is potentially a highly efficient process and the fuels it yields offer their users a high thermal conversion, there can be no doubt that over the next five years at least the prosperity of the industry will be influenced largely by its skill in using available material, sometimes quite unsuitable material, in orthodox gasmaking plants. Also the effect of that period, whether in our favour as an industry or to our cost, may be of primary influence in the longer term. We all look forward to the additional resources which current research and development now promise—the production of gas from low-grade coals at minimum cost, although not perhaps with the maximum theoretical thermal efficiency at the point of manufacture, by the development of complete gasification processes; the substitution of petroleum products and residues for coal by the use of one of the oil gasification processes. They all offer means for moderating rising prices, particularly in that their labour requirements are relatively low.

But in hoping for 'jam tomorrow' we must not forget our bread and butter today. Due to wartime building restrictions and other factors, large extensions and additions to gasmaking capacity had to be put in hand immediately after the war and in the first few years after vesting date. Although new processes must be considered whenever additional plant is required it would not be economically possible for them to replace perfectly good orthodox units on a large scale overnight; the economic differences in efficient gasmaking by the old and new means are not sufficiently revolutionary to allow the former to be written off in a few years as in several thriving branches of the chemical industry; their much heralded advantages may not make a substantial difference to our prospects for several years, and there is every reason to suspect that even in the long term they will supplement rather than replace. Meanwhile we have to carry on to a large extent with present processes, and indeed with existing plant, and in the years immediately ahead increasing competition may have to be faced with little more than present resources. With them we have to survive a critical period. It may well be, therefore, that the most vital issue affecting the industry at this time may be the economies we can achieve and maintain in the use of existing gasworks plant.

The Need for Control

Attention to the gasmaking process has always been fundamental in the gas industry. Whether it is effective depends ultimately on the time and skill which can be devoted to it at local level, coupled with the degree of instrumentation available. The smaller the place, inevitably the more difficult to ensure this because of the multiplicity of demands on a small number of people, quite apart from the expected drop in efficiency with size within certain recognized limits. 'Control' came from the gas manager himself in the form of self-criticism of his own or his assistant's working results, usually comparing them with arbitrary results based on his previous experience supported by results achieved on his own or other plant during 'guarantee tests,' and as revealed by published trading accounts. The state of the balance sheet at the end of the year tested his judgment.

For continuous achievement of best results some form of externally fixed target is helpful. Taking individual undertakings as we used to know them, such a fillip normally came from the gas manager's office and was probably most demanding and therefore perhaps most effective when the manager was himself a little detached from the process, but still with the detailed appreciation of it to impress his staff with the realism of his demand and to muster them through the difficult periods. Now, however, it is possible that there is an interest in gasmaking results several places removed from the 'blood, sweat and tears' level, and with a large number of places of different sizes to consider it may be difficult to guess at a just empirical yardstick on which to judge results achieved at each, particularly until it has been possible to bring all works plant to a reasonable, more or less uniform level. With rapid alterations in coal quantity and price it might be difficult even close to the job at district level to be continuously sure by instinct, with only normal historical accounting methods to support it, that the average operating results are giving (a) best thermal results, and (b) optimum costs. Hence apparently the need for assessing the potentialities of gasmaking plant taking into account both of these factors, and ensuring that these are achieved as nearly as possible.

Means of Control

In remote and scattered areas at nationalisation a large number of dissimilar undertakings suddenly found themselves under one banner, a bewildering experience for anyone. From such an unpromising beginning it is essential for overall success and individual satisfaction that, in time, all those employed shall feel that there has been created one successful organisation of which they are indispensable members. To this end many have come forward during the past few years prescribing for the new nationalised industries, including the gas industry, certain administrative techniques found to be successful in the management of large production industries. Most of the ideas brought forward so far prove on examination to be branches or subservient techniques of what is known as 'management accounting.' On the whole their exponents are having uphill work convincing those awkward people with an essentially practical turn of mind that their methods are more than statistical sleight of hand which will inevitably prove to the cost of the practical person in the long run because he considers that (a) more basic statistics will be required and he will have to provide them, perhaps to the detriment of those very processes in which improvement is sought; (b) his work will be analyzed to his disadvantage on a theoretical basis without proper regard to practical considerations, particularly plant limitations and variations in the quality of the raw material available for treatment; (c) such sytems are likely to open the door to cohorts of financial, administrative, and other 'non-productive' staff; and (d) the interests of a predominantly technical industry will be repeatedly sacrificed to suit idealistic administrative and financial considerations. Experience as close to us as the bulk chemicals industry suggest, however, that with proper administrative balance these fears should not be justified.

The expression 'management accounting' can cover a good many activities which are in effect its specialist tools, but broadly it may be regarded as the conception that all aspects of a business should be measured and recorded continuously in terms of money. It is usually a feature that all figures produced are almost self-critical, that is, dangerous deviations from normal proclaim themselves and clamour for attention. It is not a substitute for statutory accounting although it has led many firms to change their methods of deriving historical accounts, even influencing the final form in which these are expressed. Management accounting should give figures which reflect the position now, call for urgent action, and suggest where it should be taken.

That this type of recording was not widely adopted in the gas industry prior to nationalisation may have been partly because of the compactness of the administrative units, but the fact that there were only two main products, or more correctly derivatives, perhaps contributed the strongest reason, particularly since there was little deliberate alteration to these products year after year. In other words, unlike the engineers in other industries, gas engineers did not find it necessary to apportion the cost of a multitude of operations to a range of several products so that unprofitable ones could be recognized immediately, then eliminated, rectified, or brought to market at a more adequate price. Most of these methods

* From a paper presented to the Scottish Association of Gas Managers, Spring Meeting, Peebles, April 22, 1955.

in their first crude form were, in fact, thought out by engineers, engineers in the repetitive engineering industries. In our case it was necessary to adjust prices from time to time, but this could be done after consideration of the balance sheet together with broad future estimates, tariffs then being fixed with competitive motives. Therefore, these basic techniques which have long since been developed for many purposes other than those for which they were devised, have not been taken up on a large scale by the gas industry.

An Experiment in Scotland

In 1952, having discussed the question of operating efficiency with a firm of management consultants, the Board decided to explore a simple form of administrative control referring to the basic gas industry process, the carbonization of coal. In fairness to undertakings, it must be stated that since vesting date little or no change had been made in the technical staffing of undertakings which at that time may have been numerically low by English standards.

The basic principles underlying this decision were that: (1) local initiative should be preserved, indeed encouraged; (2) no more paper work should be introduced at any level than is absolutely necessary; (3) specialist technical help, and this includes not only personnel, but also equipment, would be available to all undertakings irrespective of size; and (4) there would be built-in recognition for quality of raw materials and the condition of plant. This system was referred to briefly in a previous paper before this Association* dealing mainly with the application of incentives to gas industry processes. Since then, however, many members have come into contact with the procedure as applied to their undertakings and it may be of interest to consider the technical aspect of the system as a whole.

The following is an attempt to summarize the procedure and at the same time to bring into perspective the relationship between the various functions of an organization when this kind of control is being applied. Though the framework is administrative and the mechanism partly financial, the people in the last analysis most affected are those of us who are basically technical.

ADMINISTRATIVE ACTION

The control begins with a resolution on the part of management at all levels that coal shall be utilized as economically as possible with existing plant, to which end the technical side shall be given adequate support and equipment.

	TECHNICAL ACTION	STATISTICAL AND FINANCIAL SUPPORT
1.	Works operating results for a representative past period, usually one year, are examined in detail.	Expressed as technical and financial results as prescribed by consultants.
2.	Working conditions are investigated on the job and altered if necessary to give the best results available.	
3.	Over a short period, usually three/four weeks, operating conditions are supervised carefully and results measured as accurately as possible.	
4.	Target figures ('standards') set based on (3).	Expressed as technical and financial results as prescribed by consultants.
5	An effort is made to maintain operating results as nearly as possible to the standards set.	Expressed as technical and financial results and continuously compared with (4) which is taken as datum. Price variance from datum revealed and eliminated.

ADMINISTRATIVE ACTION

The information derived by statistical and financial means keeps administration at all levels informed about deviations from standard technical performance, the amount of detail being reduced as it proceeds towards the apex of the administrative pyramid.
The technical people on the job should be aware of their progress and if at all possible how it compares with other works in the area.

Coupled with the introduction of the control has been the appointment of technical assistants operating from divisional/group level. Their duties vary in detail with local conditions and with the administrative arrangements consequently favoured by divisional controllers/group managers, but broadly they work with the following brief:—

1. To co-operate with district managers in the examination of operating results, in the re-adjustment of working conditions where necessary and in maintaining results at the specified level.

2. To co-operate with divisional/group accountancy staff in setting price standards and in deriving figures from district returns for use in the necessary control statements.

3. To prepare or supervise the preparation of control statements for use at district, divisional/group and area level.

4. To ensure that instrumentation is appropriate to the size of works and the plant installed.

5. To carry out chemical and physical tests at works which are individually too small to allow this to be done expeditiously and economically and with the necessary regularity on a local basis, local management being in any case fully occupied with other aspects of running the works and the rest of the undertaking.

Although the procedure has been adopted at undertakings together making about 183 mill. therms per annum or 90% of the total gas made in the area, this in fact represents but 86 of the 167 gasworks still operating in Scotland. With the exception of three divisions/groups all the technical assistants are still occupied in setting standards and it is, therefore, difficult to judge how much time will have to be given to the other activities on an established basis. At the outset, no more than one of these assistants was appointed to any division/group but the large number and particularly isolated nature of the undertakings in the North and in the South West has made it necessary to consider providing this sort of service at local groups of places (corresponding roughly to the present administrative sub-groups in these areas). This will bring the total number of appointments of this kind to 12. In the largest undertakings where there are full-time assistants responsible almost solely for the carbonizing process, the tendency has been to graft the control on the existing organisation as a supplementary aid, the main effect then perhaps being to engender a more critical attitude towards the results.

A Link with Other Systems

Comparison of this system with that small part of the flexible budgetary control system at Bournemouth gasworks† which deals with gas production reveals that they have in common the effect of focusing attention on efficiency and preserving that interest continuously. At one point in both systems there is a ritual where those directly concerned with day-to-day manufacture think critically about past and possible results and make up their minds what is a reasonable target for the future. Here it is done by a 'test run' where everybody is trying to get the best out of the plant available, sometimes with more technical help than can normally be given to the process. In budgetary control there is a time every year when all the administrative and practical people sit down together to decide reasonable operational targets for the year to come, criticizing their own and their colleagues' past efforts with an accountant to interpret their predictions in terms of cash. Savings in coal and increased production of by-products have been achieved by that system too and I am convinced that we have each caught the same fish although with entirely different tackle.

It should be added, in haste, that there the similarity of the systems begins and ends, except, of course, for the fact that results are regularly expressed and compared on a monetary basis, revealing the effect of price variation. Our assignment was very limited in its terms of reference and has been devoted specifically to saving material in the gasmaking process; no effort has been made, so far, to dovetail it into a comprehensive system of standard costs. Nor has it been extended to the utilization of labour or to any other of the undertakings' activities. The budgetary control procedure on the other hand underlies the entire administrative structure of an undertaking and may be developed to assist in doing many auxiliary jobs such as pricing work of all kinds carried out by the servicing departments, and building up forward estimates. Such facilities must be paid for and a fairly large staff on the accountancy side is a prerequisite for budgetary control.

Technical Results since Nationalisation

The economies which have been made in gas production in this area do not entirely stem from technical control. The main factors have been linkage leading to the closure of small and inefficient units, replacement and reconstruction of obsolete and inefficient plant, and improvements in plant operation by

* 'Reducing Costs by Incentives', by Alan Beaton, 1953.

† 'Budgetary Control and the General Manager', J. C. Hogg, Conference of Southern Gas Board Accountants, January, 1954.

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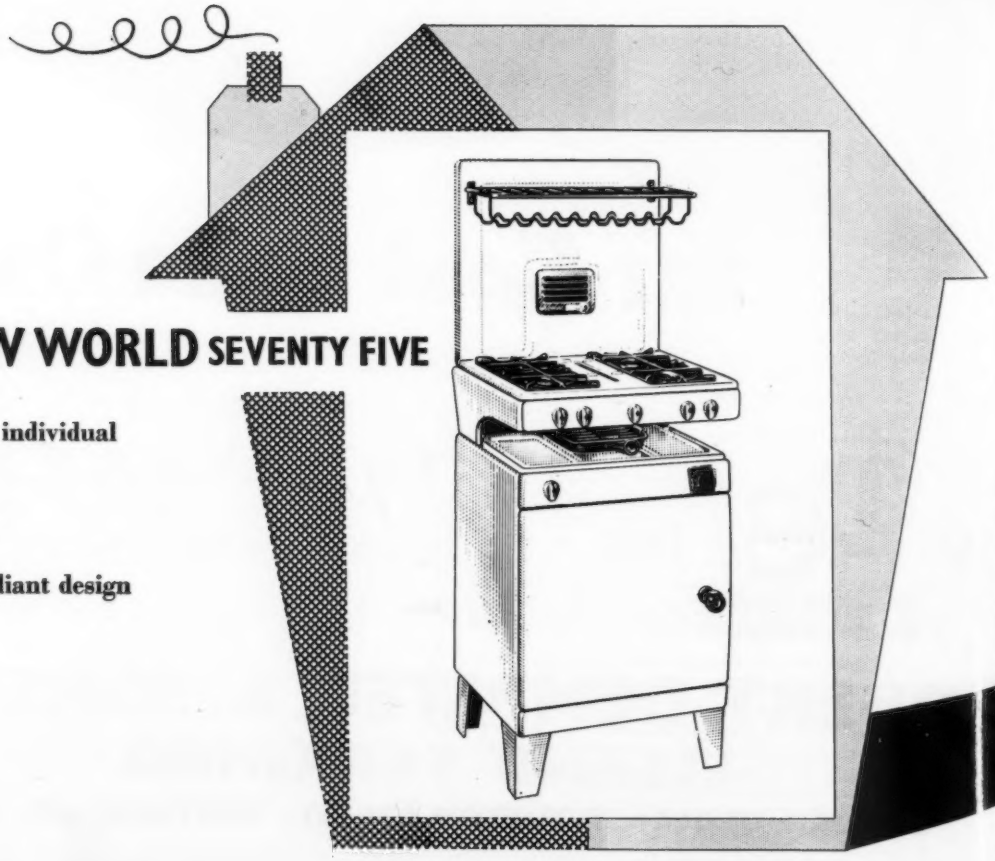

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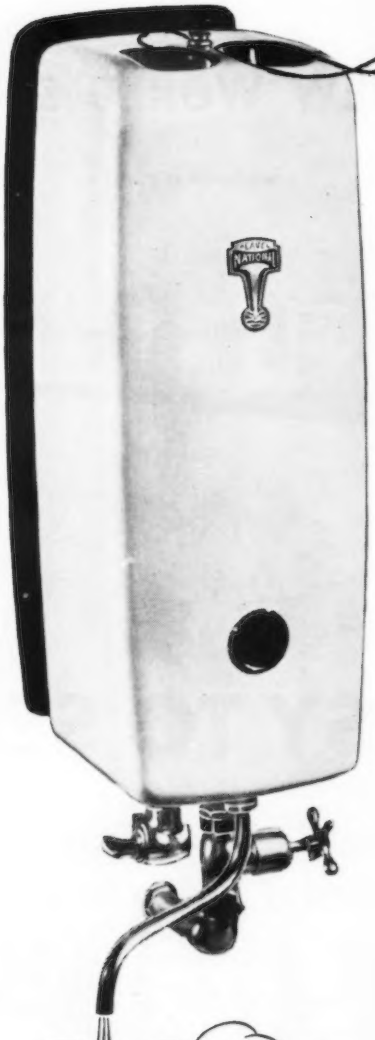

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technical control. It is true that these often occur simultaneously, making it difficult to assess their individual significance. For example, linkage may result in slightly better thermal operation of the remaining works, most pronounced when the latter is itself a fairly small undertaking. Then again the fact that a disreputable old plant has been re-groomed or replaced by something a little more presentable can be a subconscious incentive towards renewed vigour in technical control. There is in addition the salutary effect on the Board's average efficiency of the introduction of large new installations of the latest design with high gaseous yields and a low fuel figure planned almost exclusively to meet new loads, also the interlinkage of large and medium sized units on the 'grid' principle.

It is estimated that the savings achieved since vesting date by all these means represent a saving of about 57,000 tons of coal per annum and their approximate effect on the net cost of coal is shown in Table 1.

TABLE 1

	Output directly affected %	Savings in Net Cost of Coal	
		On output directly affected pence/therm	On total output pence/therm
Linkage schemes	1.8	4.10	0.08
Replacement and reconstruction ..	6.7	1.70	0.11
Technical control	100.0	0.33	0.33
			0.52

A further rough indication of the trend in operating results since vesting date may be obtained from Table 2 where the carbonizing efficiency for the calendar year 1954 at undertakings in two distinct size ranges is compared with figures derived from the Presidential Address of Mr. D. D. Melvin to the North British Association of Gas Managers in 1949.

TABLE 2

	1948/49		1954/55	
	No. of Works	Carbonizing Efficiency %	No. of Works	Carbonizing Efficiency %
Works using below 10,000 tons coal per annum	158	60.3	132	60.4
Works using more than 10,000 tons coal per annum	37	72.9	35	75.2
	195	70.8	167	72.8

The overall gain in efficiency thus revealed is first of all subject to the qualification that operating calorific values have been adjusted with consequent alteration to the ratio of gas to by-products; also the change over from production in horizontal undertakings to a greater proportion from verticals has altered the analysis of a proportion of the coke; moisture content in the latter particularly affects the calculation of efficiency by the empirical F.E.I. method. It should also be mentioned in passing that the increase in efficiency in the smaller size range of undertakings is known to be even higher than suggested (probably not less than 3%) since the previous lack of instrumentation made it difficult to obtain accurate assessments of the calorific values at the smaller places.

One of the chief technical objections to the use of the standard F.E.I. calculation as part of the control has been the variation in coal and coke quality. The standard calorific values of the coal and by-products were originally adopted as representative of English conditions. In comparison, on this basis Scottish results are at a disadvantage due to the relatively poor coals available. Taking more realistic figures the average carbonizing figure for one year's operation in the Scottish area is modified to 75.7% (coal 280 therms per ton; coke 250 therms per ton) or 74.9% including water gas and other gases. The level of operation which the many and varied undertakings in Scotland have now reached is conveyed in Table 3 and the *possible* rate of integration up to 1956 is suggested in Table 4.

TABLE 4

NUMBER OF GASWORKS IN VARIOUS SIZE GROUPS 1949/1965
A = Number of works
B = Percentage of total output

Size Group mill. cu. ft. per annum	May 1949		1955		By 1960		By 1965	
	A	*B*	*A*	*B*	*A*	*B*	*A*	*B*
Up to 15	46	0.8	34	0.6	22	0.4	18	0.4
15-30 ..	26	1.4	28	1.4	19	1.0	12	0.6
30-50 ..	33	2.9	26	2.2	14	1.3	9	0.8
50-150 ..	44	8.9	34	5.7	23	4.3	20	3.8
150-250 ..	18	7.9	13	5.4	12	5.3	7	3.2
250-400 ..	7	5.1	10	6.9	8	5.8	9	6.6
400-750 ..	9	11.8	7	8.9	6	7.4	6	7.4
750-1,500 ..	6	13.6	8	18.2	8	18.0	8	19.2
1,500-3,000 ..	4	21.1	5	24.0	6	28.7	6	29.3
Over 3,000	2	26.5	2	26.7	2	27.8	2	28.7
	195		167		120		97	

Of the linkage schemes leading to the position shown for 1960 and 1965, projects involving the closure of 24 works are now in hand and about 35 miles of the mains in the schemes included have been laid already. Superficially it may appear from the average length of main to be laid for the closures that there must be little difference in the economics of the projects to be carried out in the first five years relative to those due in the second five years. In fact, however, the latter are more expensive due to the size of the mains required and the present operating costs are not quite so heavy. Also several partly depend on mains being provided during the earlier period.

Effect of 'Material Control'

Despite the economies which had been achieved at many places due to enhanced technical supervision, before the intro-

TABLE 5

	Carbonizing Efficiency %	Gas made therms per ton	Coke and Breeze for sale cwt. per ton	Tar gal. per ton
Average results before test run	70.8	73.6	8.12	17.73
Average results predicted by test runs ..	74.1	80.4	8.40	18.02
Average results achieved since test runs ..	73.8	81.8	8.14	17.86

TABLE 3.—SUMMARY OF OPERATING RESULTS AT SCOTTISH GASWORKS, YEAR ENDED DECEMBER 31, 1954

Size group mill. cu. ft. per annum	No. of Works	Carbonizing Efficiency %	Gas Made therms per ton	Coke and Breeze for Sale cwts. per ton	Net cost of coal (Actual prices) pence per therm	Net cost of coal (Uniform prices) pence per therm
Up to 15	34	46.6	46.7	5.6	12.6	12.3
15-30	28	59.7	55.6	7.6	8.9	9.1
30-50	26	61.0	59.6	7.9	8.0	8.3
50-150	34	62.0	71.1	6.9	7.9	7.9
150-250	13	68.8	75.8	7.6	6.1	6.2
250-400	10	71.2	72.0	8.7	5.3	5.5
400-750	7	73.4	78.0	8.8	4.7	4.7
750-1,500	8	74.6	76.5	8.9	4.6	4.6
1,500-3,000	5	75.9	78.2	9.0	4.7	4.6
Over 3,000	2	76.5	71.4	9.8		
	167	72.8	73.9	8.8		

duction of material control, the intensive examinations carried out during the 'test periods' (in effect periods for tuning up the carbonizing process), suggested that further economies were possible. The control is still in the course of introduction and it would be misleading to assess its effect in practice from results at all undertakings to which it has been introduced so far, since many have been operating on the basis for a few weeks only. In Table 5, however, average operating results are given for 31 works ranging from 11 mill. cu.ft. per annum to over 1,500 mill. cu.ft. per annum, which have been under the control for over a year.

As a further indication of the working results recently achieved the carbonizing efficiency (F.E.I. basis) has been used in Table 6 to give an approximate indication of performance for 63 works grouped in representative size ranges; these works have all been under the control not less than three months. It should be stressed that although the F.E.I. figure appears throughout the control it is nowhere used as a primary criterion, only an approximate indication, week by week, or in successive four-five weekly periods of what is happening. The acid test is in the material cost of using coal to make gas, eliminating variances in coal price, and the selling prices of by-products. The F.E.I. calculation does not enter into that. Where and when fairly regular gas analysis is carried out it will be possible eventually to confirm apparent trends in overall efficiency by the more precise Hydrocarbon Enrichment Value (H.E.V.). But that would in no way affect the basic mechanism of the control.

TABLE 6

Size group mill. cu. ft. per annum	No. of Works	Results before test runs 'Reference Period' %	Results during test runs 3-4 weeks %	Results since test runs 1954/55 %
1. Up to 15	4	61.2	67.5	62.0
2. 15-20 ..	6	63.3	66.6	69.4
3. 30-50 ..	3	61.4	61.0	58.4
4. 50-150 ..	22	60.8	66.1	64.0
5. 150-250 ..	10	68.7	72.1	71.2
6. 250-400 ..	6	71.6	75.2	74.3
7. 400-750 ..	3	70.6	75.0	73.6
8. 750-1,500 ..	3	73.0	75.2	75.8
9. 1,500-3,000 ..	4	73.8	75.8	74.4
10. Over 3,000	2	76.8	77.7	75.6
	63	73.6	75.5	74.3

The Control in Practice

So far the total rate of savings predicted by the test runs have not been achieved. Even so, the present annual rate of saving relative to the previous operation is revealed by the control statistics as £135,700 or 0.18d. per therm of coal gas out of a possible £201,000 or 0.3d. per therm of coal gas and the final potential after all undertakings are brought under the control is thought to be about £240,000. These figures are all on a standard price basis. The shortfall is attributable to several factors, some of which were anticipated but set aside in the first place on the grounds that what was required was a rapid increase in efficiency and a continued trend in that direction. Some of these factors are:—

1. Divisional/group technical assistants have been fully occupied in setting standards and little time has been available for carrying out follow-up technical service.

2. A larger number of these assistants may be required for adequate service. In Scotland there are 106 works, equivalent to about 15 mill. cu.ft. per day without any personnel of this kind and it is there where assistance of this nature will be most welcome, although the service is by no means restricted to works of this size.

3. The time of the year at which standards are set. In the first instance 'standards' have been set one after the other irrespective of the time of the year, solely to bring all works within the control as soon as possible. Thus one works might have a standard corresponding to the maximum three/four weeks of the year with all retorts working at optimum throughputs and low fuel figures. Another, set say in September, might nearer represent the average condition for a full year. Yet another might be set in the middle of the lowest output period at some other part of the year where the combination of circumstances or the works unavoidably produces uneconomical working. But the thing which matters least here as anywhere is the statistics as such. They are simply a means to an end. Looking at it from the practical angle the test period is simply a time to tune up plant and to begin focusing attention on works efficiency. After that, the thing that matters is the improvement of results relative to the previous year. It may be significant that at one or two undertakings the targets are persistently exceeded despite a good plant utilization factor at the time of the 'test run.'

4. Inaccuracies in the measurement of results. The extent of the influence of this factor in a works of a given size will be evident from practical gasworks experience and may be allowed for accordingly. Short-term results at any undertaking must not be judged either too optimistically or too harshly. Probably there has been a tendency to misjudge the purpose of including an F.E.I. based efficiency in the control. This, together with the device of expressing the achieved working efficiency as a percentage of the possible efficiency determined in the 'test run' is, however, regarded as an administrative pacemaker and a rough means whereby the effectiveness of technical supervision at dissimilar undertakings may be compared. The core of the purely paper aspect of the control lies in the expression of working results on a cost basis giving an immediate indication of how much is due to price variations and how much is due to technical conditions, the one being controllable at operational level, the other not.

Introduction of a control of this kind, with its attendant services, appears to have a power to release remarkable 'hidden reserves' in any organization, reserves of a kind which are particularly needed in a dispersed field of operation. If properly operated with sympathetic and able help from one administrative level to another it can assist in creating a unity of purpose, a wider availability of skill, and a deeper appreciation of individual effort. Besides creating this cohesion of horizontal administrative planes it can also help to bring about vertical cohesion, particularly between the accounting side and the engineering side, a relationship which is traditionally maladjusted. As engineers, even as engineer/administrators, we mistrust the intentions of the accountant and strive to retain our independence. Only a free interchange of skills balanced by sound administration can, however, produce an advancing organization knowing precisely where it is going and why. In a system of this kind, and of course much more so in flexible budgetary control, the technical side is drawing on reserves created by the financial side in a spirit of team work and mutual respect. It is not and I am sure that the accountancy side would never wish such a system to become, to coin a word, an 'auditocracy' or management by financial strangulation.

A precise financial evaluation of the savings available by technical means should encourage a greater outlay on technical amenities which that part of the control will almost certainly prove to be necessary. By keeping management at all levels fully informed at brief intervals it should favour decentralization.

When the control has been established at all works in the area it will be necessary to re-examine in detail the standards set and the results achieved so far, to ensure that works of comparable size and condition are being considered in the same light and to assess the effect of the factors previously discussed. After all the test runs have been carried out it will be possible for a more comprehensive technical service to be made available, and although the precise form and scope of such service will vary from place to place, depending on the division/group organization, an effort is being made to promote a free and regular interchange of views from one part of the area to another so that uniform good practice may be achieved. On the accounting side of the control the original practice of accumulating the price variance since the inception of the control has now been modified and this variance will now be shown up on a year to year basis and identifiable with the standard accountancy coding practice.

INDUSTRIAL and commercial premises in which more than 200 persons are employed are now covered by the industrial civil defence scheme, which has hitherto been restricted to larger firms in the major built-up areas.

RESEARCH ON DOMESTIC HEATING AT THE FUEL RESEARCH STATION—from p. 240.

tion. Similarly the contribution of the lagged flue pipe, in the case of stoves, was not determined for all the appliances quoted, and so this item has been included with the 'useful output' for all the appliances in Table V.

While much remains to be established, certain trends, which appear to be systematic, emerge from the figures quoted in Table IV for inset and free-standing open fires. They are as follows:—

(1) Changing from coke to coal at the full rate of burning normally reduces the useful efficiency by about one-quarter.

TABLE IV.—HEAT-BALANCE DATA FOR OPEN FIRES

Appliance	Throat restrictor	Fuel	Rate of burning	Heat distribution, %		
				Useful output	Sensible loss	Remainder
Improved open fire "A" ..	None	Coal	Fast	26	57.5	16.5
	None	Coal	Slow	30.5	40	29.5
	None	Coke	Fast	35.5	53.5	11
	None	Coke	Slow	36.5	47	16.5
	Closed	Coal	Fast	31	46.5	22.5
	Closed	Coal	Slow	34.5	34.5	31
	Closed	Coke	Fast	39.5	44.5	16
Free-standing fire "C"	Closed	Coal	Fast	32	36.5	31.5
	Open	Coal	Fast	27	49	24
Free-standing fire "D"	Closed	Coal	Fast	33.5	38	28.5
	Closed	Coke	Fast	45.5	39.5	15
Free-standing fire "E"	Closed	Coal	Fast	31	43.5	25.5
	Closed	Coke	Fast	42	44	14
Free-standing fire "F"	Closed	Coal	Fast	32	40	28
	Closed	Coke	Fast	42	40	18

TABLE V.—HEAT-BALANCE DATA FOR STOVES

Appliance	Fire-doors	Fuel	Rate of burning	Heat distribution, %		
				Useful output	Sensible loss	Remainder
Openable stove "G"	Open	Coal	Fast	36	36	28
	Open	Coke	Fast	56	42	2
	Closed	Coal	Fast	72	11	17
	Closed	Coke	Fast	69	17	14
	Closed	Coke	Slow	74	15.5	10.5
Openable stove "H"	Closed	Coal	Fast	44.5	25.5	30
	Closed	Coke	Fast	50	27.5	22.5
	Closed	Coke	Slow	60.5	17.5	22
Closed stove "J"	—	Coal	Fast	52	13	35
	—	Coal	Slow	58	11	31
	—	Coke	Fast	69.5	17	13.5
	—	Coke	Slow	85.5	14.5	0
Closed stove "K"	—	Coke	Fast	76.5	19	4.5
	—	Coke	Slow	76.5	13.5	10
Closed stove "L"	—	Coke	Slow	84.5	6.5	9
Closed stove "M"	—	Coke	Fast	83	12	5
	—	Coke	Slow	83	3	14

This is accompanied by a corresponding increase in the potential loss, the sensible loss being little affected.

(2) Reduction in burning rate increases the useful efficiency, the effect being marked with coal and probably less so with coke. The whole distribution of heat losses is altered, the net gain involving a reduction in sensible loss and an increase in potential loss.

(3) The effect of a throat restrictor is again to produce a net increase in useful efficiency, with an increase in potential loss and a decrease in sensible loss.

There is, however, no consistent pattern in the figures in Table V obtained for closed stoves and for openable stoves operated with the fire-doors closed. For example, closed stove 'J' has a coal/coke efficiency ratio very much the same as that of an open appliance. Openable stove 'G' on the other hand, when operated closed burns coal and coke with the same high efficiency. At some later stage it is hoped to repeat the measurements on this latter stove and see whether the relatively high efficiency with coal is accompanied by a relatively low smoke emission.

REVISED BRITISH STANDARDS

The British Standards Institution announces the publication of revised British Standards for cresylic acid of specified ortho-cresol content (B.S. 517:1955); cresylic acid of specified meta-cresol content (B.S. 521: 1955); *ortho*-cresol *meta*-cresol and *para*-cresol (B.S. 522:1955); phenol (B.S. 523:1955); and refined cresylic acid (B.S. 524:1955). The series has been revised to bring the specification up to date, particularly with regard to methods of test. These methods of test are based, as before, on those recommended by the Standardization of Tar Products Tests Committee (S.T.P.T.C.) in the 1950 edition of 'Standard methods for testing tar and its products.' In Standards 517, 523, and 524, the 'specification' clauses remain unchanged from the 1948 edition. In B.S. 521, the five well-established grades of cresylic acid have been redefined so that the maximum meta-cresol content for Grade A is now 60%. In B.S. 522, a third grade (Grade C) of *ortho*-cresol has been added, having a crystallizing-point between 28.3 and 29.3°C. Copies may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, W.1; prices: B.S. 517 and 521, 5s.; B.S. 524, 4s.; B.S. 522 and 523, 3s.

TAR PRODUCTS IN WESTERN GERMANY

Coke output at gasworks and coke ovens in Western Germany dropped slightly from 41.9 mill. tons in 1953 to 39.1 mill. tons in 1954. Production of by-products showed a smaller drop, from 1,615,000 tons to 1,607,000 tons in the case of crude tar, from 444,000 tons to 435,000 tons in that of crude benzole, and from 450,000 tons to 418,000 tons in ammonium sulphate.

According to the March issue of *Die Chemische Industrie*, sales of tar products during the year were on the whole satisfactory, and since the middle of the year naphthalene has moved to a position of scarcity. Exports of creosote to the United States, which were 75,000 tons in 1953, dropped to a third of this amount last year, but more tar oils were used as fuels in Germany. With the coming into commission in August last of the plant of the Phenolchemie G.m.b.H. in Zweckel with its annual capacity for 8,000 tons of synthetic phenol, the needs of the German plastics industry should be fully met.

Demand for benzole was active during the year both for use as a motor fuel and as a chemical raw material, and it was necessary to supplement domestic output by higher imports, such imports (of crude benzole and its products) rising from 38,000 tons in 1953 to about 132,000 tons last year.

The plant at Gelselkirschen at which benzole is pressure-refined by the Scholven Chemie A.G. has been in operation since August last, producing high purity benzene with a melting point of 5.4°C. and which can be used directly for all chemical syntheses. Plant for the similar purification of toluole and xylole is expected to be in operation this year. The three plants in Western Germany operating this pressure-refining process processed 2.2 mill. tons of crude benzole last year or one fourth of the total production in the country of this material.

Output of the Fischer Tropsch process plants increased from 31,370 tons in 1953 to 36,600 tons last year with the demand from the chemical industry for the Kogasine fractions greater than supply. Towards the end of the year the Krupp Kohlechemie G.m.b.H. restarted its plant, mainly for the production of hard paraffins.

Output of coke oven phenol increased last year by 6% to 8,300 tons, while production of hot pressed naphthalene rose by 14% to 59,600 tons. There was also a 24% expansion in the production of anthracene, which reached 4,300 tons.

Etruria, Stoke-on-Trent, Gasworks.—We regret that, due to a printer's error, the caption to Fig. 11 in our article describing these works (last week's 'JOURNAL,' p. 181) was incorrectly given. It should, of course, have read: 'Fig. 11. Illuminated control panel in the starter house.'

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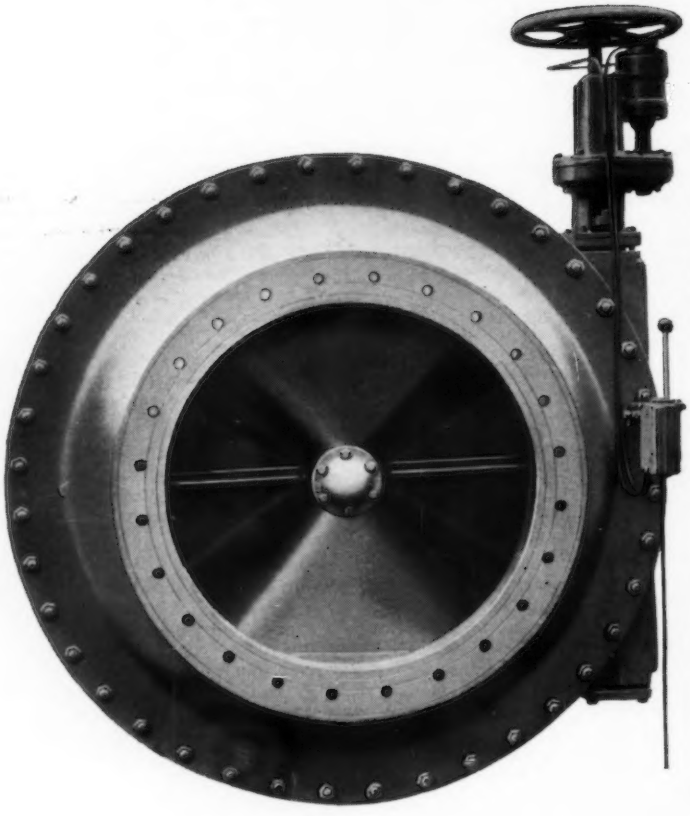

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C.U.C. CONVENTION discusses COKE

The availability of coke and the service obtained from it formed one of the principal subjects under discussion at the Convention of the Coal Utilization Council (C.U.C.) held at Eastbourne on April 18 and 19. The C.U.C. may be regarded as a competitor of the gas industry in that it tends to give preference to solid fuel for a number of functions which can be carried out by gas, but it is unfully in the sense that coke is regarded as providing a substantial solution to the problem of air pollution, and the Council does excellent work in encouraging the more efficient use of coke and coke-burning appliances. It may be that the work of the Council is only imperfectly understood by many in the gas industry, and for this reason it is fortunate that in his opening address the President of the Council, **Mr. J. Stanleigh Turner,** outlined the policy and function of the Council.

He explained that the C.U.C. was an association of bodies professionally interested in the domestic use of solid fuel. They represented the producers of coal and other solid fuels derived from coal; its distributors; the manufacturers and designers of solid fuel-burning appliances; and those concerned with selling these appliances, fixing and servicing them. The Ministry of Fuel and Power was an observer member of the C.U.C. and the Council maintained close liaison with the Women's Advisory Council on Solid Fuel, which represented thousands of housewives throughout the country.

C.U.C. Policy Described

The Council's aim was to promote the more efficient utilization of solid fuel in the home through the use of modern appliances and the wise choice of fuel to burn in them. They sought to educate local authorities, architects, builders and householders; to induce them to take advantage of the wide range of up-to-date equipment now available; and to ensure that this equipment is properly selected, installed and used. In other words, they aimed to show the domestic consumer and those who served him how to get more heat and more comfort from the limited supply of coal available.

They tackled their problem in as many ways as possible, consistent with the resources at their disposal. They advertised both nationally and locally. They offered news items and authoritative feature articles for Press and radio. They participated in exhibitions. They maintained a steady flow of informative and attractive publications. They seized every opportunity of co-operating with other bodies in furtherance of their aims.

Turning to the organization of the Council, Mr. Stanleigh Turner explained that their day-to-day work was largely decentralized in 11 regions, each with its own committee and regional officer. Buttressed by this regional framework, the organization had three main pillars. First, they had the panel of authorized distributors of appliances. There were now over 750 panel members whose staffs had attended courses at one or other of the Council's two training centres. More than 6,000 students had passed through these centres. The Council's list of recommended appliances had become pretty well known and the C.U.C. sign displayed in a showroom was beginning to mean something to a wide section of the public. Secondly, the Council provided training for coal merchants and their employees and it awarded a certificate for technical proficiency in the knowledge of solid fuels and their uses. More than 1,200 certificates had so far been awarded, enabling an increasing number of coal merchants to display the Council's Coal Merchants Diploma Service sign, which indicated a proportion of certificated staff. Thirdly, there were the regional information centres which offered expert and impartial advice on appliances and heating problems. Information centres would be opened in the remaining regions in due course and a second for the South Western region would be opened at Plymouth, where they had already secured suitable premises. In addition, they had an excellent display at the Building Centre, in London.

The Evil of Smoke

Mr. Stanleigh Turner said the fact must be faced that nearly half the smoke in the air came from domestic chimneys. The evil was concentrated in urban areas during the season when natural fog was most prevalent. In these so called 'black areas' domestic consumers used 19 mill. tons of bituminous coal a year. This coal could not be burned entirely smokelessly in domestic appliances. Yet the modern appliances they recommended could reduce the amount of smoke appreciably. And all of them gave good, and even better, service on smokeless fuels.

One obstacle to a rapid cure of the domestic smoke evil was the public preference for the open fire. Another was the dearth of smokeless fuels. But the Beaver Committee had suggested that enough coke and other smokeless solid fuels could be found to make a determined start on smoke elimination. It was proposed, therefore, that there should be a progressive extension of smokeless zones and 'smoke control areas' where the domestic consumer would be allowed to use only smokeless fuels. Coke was the only smokeless solid fuel likely to be available in quantity in the immediate future. The Beaver Committee recognized that coke did not usually burn very well in old-fashioned grates. If it was to be substituted for house coal in the smoke control areas, then the new approved appliances would be very necessary, as they were originally designed for operation on smokeless solid fuels and were, in fact, tested for efficiency on these. If all the households in all the black areas were ultimately to go over to smokeless solid fuel, then new appliances would be required for no fewer than 7 mill. houses. This was a measure of the scale of the problem. It was also a spur and a challenge. But adequate production capacity already existed to meet any increased demand for the more efficient appliances.

'Let there be no mistake about where the Council stands on this issue,' continued Mr. Stanleigh Turner. 'We firmly believe that the Government is right to tackle the evil of air pollution with all possible vigour. We are ready and anxious to co-operate fully in that part of the clean air drive which comes within our province. I do not think this calls for any major changes in our programme or organization. But we intend to make a special effort to cater for those—householders, landlords, builders and so on—about to be confronted with the problem of switching to smokeless fuels. Our basic aim—which is in full accord with Government policy—remains unchanged. It is to ensure that solid fuel shall continue to carry the main winter domestic space and water heating loads—and do it efficiently without smoke.'

The Convention then got under way with the presentation of a paper by **Sir Hugh Beaver,** Chairman of the Advisory Council for Scientific and Industrial Research, and Chairman of the Committee on Air Pollution. At the outset Sir Hugh referred to the interruption in the introduction of legislation relating to air pollution as a result of the forthcoming General Election. Since the present Government was committed in principle, and the Opposition had extended a promise of support, it was pretty certain that whichever party formed the next Government, legislation would be made in the Queen's Speech. It was now unlikely that the Bill would go through before December, but when it did go through he did not think much could be added to or subtracted from his Committee's recommendations.

The most important thing in the report from the point of view of the C.U.C. was probably the Committee's reliance on coke as the main cure for the domestic smoke problem. Now this was a convention of the *Coal* Utilization Council. He was not really quite clear what that title now implied or originally meant. He presumed that the Council was founded at a time when the place of coal in our fuel economy was being threatened—or seemed to be threatened—by gas and electricity. In his own lifetime he had seen the see-saw of apprehension on this subject of coal—sometimes fears—of the growing shortage of our coal resources; at other times the threat that coal was losing in the fuel battle, that our coal fields would go out of operation for lack of demand, and that the industry would be ruined. Neither seemed very imminent to us now, but in the whirligig of time both views would no doubt come round again. Today, however, what the Council's title

must mean was the *economic*—the *efficient*—utilization of coal.

And even that was not the whole story, because if the report was to have any effect, then so far as the domestic consumer was concerned it was the utilization not of raw coal but of treated coal—i.e., coke—that was now necessary.

Before discussing coke, Sir Hugh made points about coal. The first was that we would not need to depend for a cure of domestic smoke almost wholly on coke, if we had plenty of low volatile coal. The point at which bituminous coal in the domestic grate became offensive from the point of view of smoke was often hotly debated. For some time, expert feeling on his Committee had been inclined to put the ceiling at 16% volatile content. Eventually they decided on 20% for the domestic grate; and of course no limit for industrial use. In St. Louis in the United States where a great smoke clean-up had been achieved, they put the ceiling at 23%. But they were only able to do this because the open grate did not exist there. Our problem here was the open fire and our prevailing high volatile coals.

That led him to his second point. Clearly one could not say that it was impossible to burn bituminous coal in an open grate relatively smokelessly. It needed a special design of grate with definite controls of draught and air; and such an appliance needed to be scientifically operated. Given so much, for large parts of the time relative smokelessness would be achieved; but even so they had come to the conclusion that the very best results would not show better than about 60% saving in smoke; and no ordinary man or housewife would even get anything like that degree of success. From their point of view there just was not any known open grate which could be guaranteed to operate smokelessly with ordinary coal in ordinary household conditions. That might be challenged. It was certainly a challenge to research and ingenuity; and he thought an aswer might well be found. But there was no present answer, and no indication of an answer within the immediate future.

Domestic coke was already well known and well accepted as the domestic fuel in some parts of the country. It had a long way to go before it would give satisfaction to all users in all parts of the country. That was because so much coke was not the right coke for domestic use. His committee's views on this vital question were worth recapitulating. For so far as could be seen ahead, the Committee had accepted the Ridley Committee's view that the bulk of domestic space heating and most of the water heating must be by solid fuel. The ordinary householder would continue to demand an open fire. The only fuel that would not add to the smoke nuisance and would at the same time be within the ordinary person's purse was coke. First class domestic coke—reactive, clean, graded—was technically practicable, and therm for therm gave better value than the same expenditure on coal. The public must be given proper coke service—the right type of coke, with the right frequency of delivery, at the right price, and the right appliances to use it, properly installed.

This was what faced all who were interested in the provision of domestic fuel and of the appliances for them, and in the education of the public on these matters. On this rested to a large extent the success or failure of the campaign for clean air. He had devoted his remarks to the domestic side of the problem. The industrial side, so far as coal utilization was concerned, was from his Committee's point of view more obvious and simpler. The domestic side was the crux.

There followed the inaugural luncheon at the Grand Hotel, in the course of which the toast of the C.U.C. was proposed by **Mr. L. W. Joynson Hicks,** Parliamentary Secretary to the Ministry of Fuel and Power. During his remarks he promised that there would be no diversion of solid fuels from the white areas to the black areas, and said that notwithstanding the coke shortage of this winter he was satisfied that the necessary stocks of solid fuel would be available within the period suggested by the Beaver Committee. Mr. Joynson Hicks referred also to the gas industry's programme of carbonization, and expressed

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confidence in the adequacy of coke stocks to be built up for the coming winter. He could not resist the temptation of pointing out in the presence of Mr. Alfred Robens that it was an undeniable fact that there had been no fuel crisis during the past few years.

Replying for the C.U.C., **Sir John Charrington,** the Vice-President, admitted that he was worried about where all the coke was to come from, and felt that as a result of the loose statements which had been made, some people, such as the mayors of certain London boroughs, thought the plans for clean air would be effected not in 15 years but in 15 weeks. He hoped that when the Bill was passed there would be a Clean Air Council which could speak with authority.

A Manufacturer's Approach

In the afternoon the position of 'Domestic Solid Fuel Appliance Design and the Beaver Report' was described by **Dr. Harold Hartley,** Chairman of Radiation Ltd. Dr. Hartley's paper was in two parts: Part 1 indicated the magnitude of the pollution problem and some of the recommendations of the Air Pollution Committee, and drew attention to parts of the report as they affected the domestic situation; Part 2 submitted data which indicated the stage now reached in the designing of domestic appliances which will yield high efficiencies and, when coal is burnt, effect considerable reduction in smoke emission. In the course of his remarks, Dr. Hartley said that domestic coal today was expensive, and additional supplies of 'smokeless' fuels when made available would be more costly still. He quoted Dr. Bronowski, at the first C.U.C. Conference in Harrogate, as having spoken even then of an increased price of £1 per ton for a prepared fuel, and the Air Pollution Committee had based its cost computations on the assumption that the price increase might be of the order of £1 per ton over present-day coke prices. It was claimed that price increases would be justifiable because of the increased efficiency obtainable with appliances suitable for burning smokeless fuels. The price differential justifiable decreased as the appliance efficiency was increased, and increased price could not be justified from the thermal efficiency point of view when the fuel was burned in high efficiency closed stoves. The room heating efficiencies quoted in the Ridley Report had been accepted as the yardstick by the Air Pollution Committee, but today heating efficiencies of 75% and higher were attained with domestic appliances burning coal, the efficiency being the same as was attained when coke was used in the same apparatus. Simplified forms of such appliances could be provided, and their adoption in new houses was desirable. The Beaver Report, however, stated: 'Smoke can be reduced by the careful use of well-designed closed stoves and of some of the latest improved open fires, but at the present time there is no prospect of developing an open fire or a stove which could take the place of the open fire capable of burning bituminous coal smokelessly.' This latter statement was correct only if it was intended to apply the literal meaning to the word 'smokelessly.' Dr. Hartley then turned to the types of coal-burning appliances available for the zones, and described such appliances as the 'Heatmaster' and the 'Parkray,' both of which have been described in the 'JOURNAL.'

Replacement of existing domestic appliances should be done with high-efficiency types designed to minimize smoke emission when used with bituminous coal, and suitable also for use with 'smokeless' fuels; in this way progress in the elimination of smoke would be accelerated. It should not be necessary to permit the continued existence of 'black areas' for a further 15 years. The reduction of domestic smoke need not wait on legislation nor on the provision of additional supplies of 'smokeless' fuels; a start could be made by the raising of the standards of performance to be attained with appliances for use by local authorities. Insistence on the adoption of higher standards for performance and for production of appliances was a necessary preliminary to effective action in the domestic sphere.

The cost of appliances was much influenced by the methods of production which had to be adopted. With bulk production, specialization could be introduced and prices could be reduced markedly; the magnitude of the saving possible in appliance cost was such as would reduce considerably the capital expenditure needed to provide clean air for the community.

In Defence of Coke

In view of the emphasis which Sir Hugh had placed on coke and which Dr. Hartley had placed on coal, it was significant that the discussion should be opened by **Mr. H. F. H. Jones,** Chairman of the Solid Smokeless Fuels Federation and Deputy Chairman of the Gas Council. Mr. Jones reminded delegates that the Solid Smokeless Fuels Federation included the Gas Council, the British Coking Industries Association, which consisted of the National Coal Board ovens, iron and steel producers' and independent coal ovens, the National Coal Board, both Western Regional and the Low Temperature Coal Distillers' Association.

Dr. Hartley had suggested that the progress made in appliance design justified reconsideration of the opinion of the Air Pollution Committee that domestic smoke emission could only be stopped by prohibiting the use of bituminous coal and replacing it with smokeless fuel. In making this statement he thought that Dr. Hartley had found himself in some isolation from the main concensus of scientific opinion. Certainly the Solid Smokeless Fuels Federation has seen nothing which led it to believe that the problem could be solved without a great extension in use of smokeless fuel in domestic premises. This view was supported by the last published report of the British Coal Utilization Research Association in which it was stated that the whole problem of designing efficient domestic appliances would be simplified by the use of smokeless fuels.

Dr. Hartley had put the word 'smokeless' in inverted commas when referring to smokeless fuel. He did not want to split hairs on this point, but so far as the Federation was concerned, they were prepared to accept the word smokeless in the sense in which it was used by the Beaver Committee. They believed that open fires operated on down-draught were of dull and unattractive appearance when compared with open fires burning smokeless fuel with normal up-draught, and they needed skilled attention. He found it hard to believe that appliances, which required from 2¼ to 2½ cwt. of fuel per week, or, say, 10 cwt. per month, could really provide the answer to smoke abatement. Sir Hugh Beaver did not appear to think so, and nor did he. With regard to these very high efficiencies of 75% to 80%, he wondered whether Dr. Hartley had taken account of the amount of heat emitted into the dwelling and which in summer time might be thoroughly unwelcome. He agreed entirely that more efficient appliances should be installed in new houses, but according to a recent paper to the Institute of Fuel by McHugo, Shaw, and Whittaker (see p. 237 of this issue), the free-standing appliance when burning coal was no more efficient than the built-in type with proper restrictions of chimney air flow. Dr. Hartley must, he thought, be assuming continuous burning, but for much of the year continuous burning was unnecessary and a combination of solid smokeless fuel with a gas ignition burner enabled the consumer to enjoy a bright and satisfactory fire when he required it and to let it die out when he did not, without fear of difficulty in lighting it up again when required, and without emission of smoke during the ignition period. He believed that Dr. Hartley's efficient appliances would be even more efficient and smoke-proof when used with smokeless fuels.

Turning now to Sir Hugh Beaver's address, it was his duty to show how the solid smokeless fuel industry could assist in the implementation of the policy recommended by Sir Hugh's Committee, accepted in principle by the present Government, and welcomed by the Federation. The present disposals of solid smokeless fuel to the domestic market are approximately as follows, in million tons: Gas coke 2.50, hard coke 1.1, low temperature coke, 'Coalite' and 'Rexco' 0.42, graded anthracite and dry steam coal 1.63, and smokeless ovoids ('Phurnacite') 1.1, giving a total of 5.22 mill. tons.

He agreed with Sir Hugh Beaver in rejecting in the present state of knowledge the use of bituminous coal in open fires of any kind. There were two ways in which more solid smokeless fuel could be made available for domestic consumption. First, some of the fuel now being sold in other markets could be replaced by coal or oil in large installations in which these fuels could be burnt smokelessly. By this means an

increased tonnage of smokeless fuel up to about 4½ mill. tons per annum could be transferred, and this fuel would mainly be gas coke. The second method would be to manufacture more of these fuels. The gas industry was capable of producing more smokeless fuel provided that a larger allocation of coal was provided for its manufacture. Of recent years the industry had been limited in the tonnage of coal which it had been able to secure so that not only had coke production suffered, but of the coke made a considerable proportion (1.5 mill. tons) had to be used to make carburetted water gas. About 27 mill. tons of coal per annum had been carbonized, producing for sale about 11 mill. tons of gas coke. Within quite wide limits each additional ton of coal supplied to the gas industry would enable some three-quarters of a ton or more of coke to be placed on the market, and this coke, by replacing coal in smokeless zones, should enable still further coal to be made available for carbonization, thus again increasing the availability of gas coke for sale, possibly doubling the amount of gas coke available for the domestic market without adding to the plant construction programme of the industry. Much of the coal now being burnt in the domestic market which would thus be released would be suitable for carbonization, and the construction of additional plant would enable the process of replacing coal by coke to be extended.

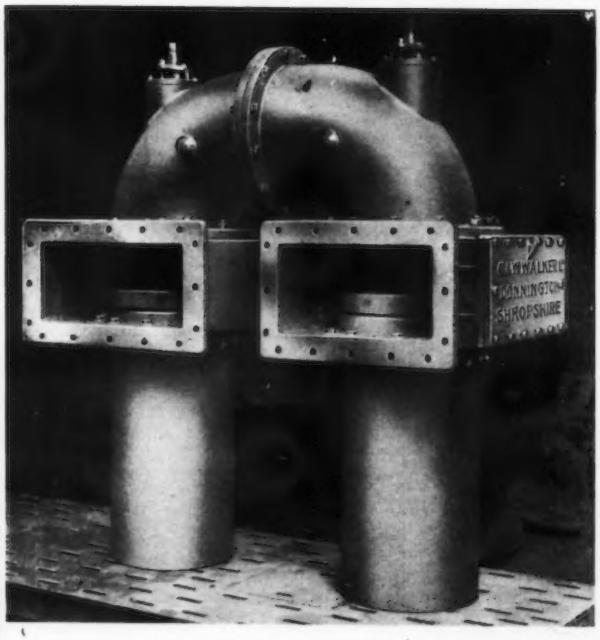
Mr. Jones said that he must not give the impression that only the gas industry could make more smokeless fuel. Given suitable coal and a correct operating technique there was no reason why good domestic coke should not be made in coke ovens; and whether or not the low temperature carbonization industry expanded must depend both upon availability of coal and on economic circumstances. The production of increased quantities of smokeless fuels of good quality in the last resort would become an economic matter and alterations in method to improve quality and increase production would involve some cost.

The price of gas coal delivered to gasworks had increased between 1938 and 1954 by more than 260%, making its present cost over 3½ times that in 1938. House coal in the same period increased in price by about 180%. These figures were a measure of the handicap under which the carbonizing industries operated. In London the figures were even more unfavourable. Those interested in comparative costs of heating would do well to study appendix 9, table 1, of the report. The benefit from using coke was clearly shown.

The production of good coke from coals outside the range of best carbonization coals was technically possible, but coal must be clean and the price must be right. Supplies of good carbonization coal were also needed by the gas industry to maintain full supplies from existing plant. A plan could be made with the co-operation of the N.C.B., the plan would fail if this was not forthcoming.

Finally, Mr. Jones had a word for the distributors of solid fuel. There was no doubt that some consumers had been unable to obtain coal and coke except after excessive delay, although unprecedented quantities had been delivered. Some gasworks had reached a rate of output of coke during recent weeks which could not be increased for physical reasons, such as traffic on the roads and lack of space in the works. Everything possible should be done to persuade housing authorities to provide storage space adequate for smokeless fuel, to persuade consumers to keep their stores well filled up, especially at the end of the year when the coldest weather began. Distributors themselves must carry reasonable stocks of smokeless fuel to supplement deliveries from the producers during times of peak demand. Unless by these means local shortages could be avoided, more and more consumers would be lost to gas, electricity and oil.

Building Centre Bulletin.—The April issue of this Bulletin is extensively illustrated, and includes shots of the Gas and Solid Fuel Appliance Sections. There are short articles on the history and the working of the Centre. During the years 1950-1954, the *Bulletin* states, 331,198 people visited the Centre.



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HULL 'MENU BY TELEPHONE' SERVICE

A new 'Ring for a Menu' idea has been introduced at Hull, whose Corporation-owned Telephone Department is the only system of its kind in Great Britain. Housewives who are wondering what to have for lunch can simply dial 21835 to hear a suggested menu; they can hear it over and over again until they have taken it down.

Who provides the menus? These are collated alternately by a panel of three cookery demonstrators from the Hull Group of the North Eastern Gas Board and three from the Yorkshire Electricity Board. The girls record the menus on tape which is then played back into the system through 300 lines.

The idea was conceived by Councillor Geoffrey Waddington, member of the Hull City Council, and he introduced the service on the first day. Some 3,340 calls for menus were made during the first week, which leaves no doubt that Hull housewives are quite 'taken' with this new idea. Incidentally, the new service has been very much in the news, having been featured in the B.B.C. News of the North and Radio Newsreel as well as in most of the national newspapers.

Our photograph shows Miss Elizabeth Sproule, Senior Home Service Adviser, Hull Group, seated, Miss Dorothy Stainton, standing left, and Miss Beryl Jamieson, standing right, in the recording studio.

SPECIAL FURNACE COKE

A special carbonized and prepared furnace coke suitable for use on the open fire may soon be available in significant quantities in the North Midlands to help meet the demand for solid smokeless fuel which was expected to follow the implementation of a clean air policy by the Government, said Mr. Eric Bellingham, Director-General of the Coal Utilization Council, to members of the C.U.C. North Midland Region at their annual luncheon in Nottingham on March 30. The fuel would come from furnace coke ovens.

Speaking of the problems created by domestic pollution Mr. Bellingham said it was no use blackguarding the coal distributive trade about the maldistribution of solid smokeless fuels. There were limited supplies of these fuels and a vast reorganization of their availability would be necessary before a clean air policy could really be nationally implemented. Many ill-informed people thought that the C.U.C. stood for smoky chimneys. This he denied, saying that the Council had always stood for the efficient use of solid fuel in modern appliances, and for smoke abatement.

Mr. F. Bowen, Chairman of the North Midland Region, welcomed panel members and coal merchants from many parts of the area to the luncheon and to the annual meeting which followed. The Committee's annual report revealed that only two firms had resigned from the panel of authorized distributors when the revised conditions of membership were introduced. There were now 61 panel members in the region.

The report commented on the further general improvement in the standard of showroom display and stated that 'Those firms who have spent considerable sums of money on showroom improvements invariably seem to have been favourably impressed by the increase in business.' During the year 15 more firms had qualified for the coal trade Diploma scheme, bringing the number of coal merchants to 35. The scheme covered 142 depots handling 472 tons a year.

The Scottish Gas Board has received a protest from Midlothian Trades Council over the plan to close Penicuik and Dalkeith gasworks. The protest has also been sent to the constituency M.P., Mr. David J. Pryde, and the Scottish Trades Union Congress. A meeting of the Trades Council on April 10 also decided to ask the Gas Board to meet a deputation, including Midlothian County Council, to discuss setting up a distillation plant at an industrial site in Dalkeith. The plant, for treating coal, would help to balance the industry and employment problem in the area. Mr. Ralph Gibson, Secretary of the Trades Council, stated that after representations that the National Coal Board should develop the plant they had received a negative reply.

Anglo-French Fortnight

The Cardiff undertaking of the Wales Gas Board was invited by the Société Franco-Anglaise de Cardiff to participate in celebrations held in the city for a fortnight from March 28, during which cookery demonstrations were given in the city showroom. In addition a magnificent Lucullus table was prepared by local French chefs and exhibited at the showroom on April 1.

On that occasion the chief guest was Madame Chauvel, wife of the newly appointed French Ambassador. By tradition, the first visit of the French Ambassador outside London is to Edinburgh, but because of the importance of the Principality's Anglo-French fortnight the Ambassador and his lady went to Wales to share in the festivities. This was their first official duty outside London, and while M. Chauvel was being shown the latest thing in coal mines, Madame Chauvel was being made to feel at home with a demonstration of high class French cooking by competent French chefs. She was accompanied by Madame Langlais, wife of the French Consul, and by Mrs. Cennydd Traherne, wife of the Lord Lieutenant of the County. They were presented with a bouquet of roses by a home service adviser, dressed in traditional French costume.

German Tar Still Accident

An unusual tar works accident resulting in the deaths of three men is recorded in the March issue of *Die Chemische Industrie*, of Düsseldorf. At works in question it has long been the practice for the stills used for the production of road tar to be put out of commission for part of the winter for cleaning and maintenance work.

This winter, the usual routine was followed; the manhole covers and pitch run-off pipes were removed and after about two weeks standing to ensure ventilation of the interior, men entered to dig out and remove the pitch coke residues on the still walls.

A man engaged on this task suddenly collapsed; another man who went to his aid was similarly affected; while a third looking into the still through the manhole was affected by a sudden uprush of gas, lost his balance and fell into the still.

Post-mortem examination of the victims revealed no evidence of poisoning by carbon monoxide, hydrogen sulphide or cyanogen compounds, and the only conclusion drawn was that the deaths were probably due to carbon dioxide poisoning, this gas being liberated in high concentration on the sudden ignition of a pitch dust-air mixture during the digging out of the pitch coke.

It is pointed out in the report that the men engaged on the work were not roped together and that reliance had been placed wholly on the natural air ventilation of the empty stills, both practices contrary to official safety recommendations but which had been used at these particular works for many years.

INSTITUTION PRESIDENT PLEADS FOR BROAD OUTLOOK

The necessity in these days of specialization for members of the gas industry to keep in close touch with other departments was emphasized by Mr. W. K. Tate, President of the Institution of Gas Engineers in an address at the annual general meeting of the Wales and Monmouthshire Junior Gas Association at Porthcawl on April 14. 'There is no doubt that nationalisation has made a tremendous difference in our mode of life and work and personal standing,' he said. 'In Wales the Board has approached the matter with great flexibility and feeling for the sensibilities of all who work for it. I know the Board fully supports the Institution and your Association and it seems to me that it is up to members to justify that support.'

Specialization in gas engineering was one of the threats of nationalisation which one was bound to get in these tremendous enterprises with large numbers of employees. They channelled themselves into their own little spheres and became confined in their outlook. Nobody could do justice to themselves or to their employees unless they had a broad picture of what was going on in their own industry. It was necessary to know what was going on in other parts of their own industry. Only in that way could they appreciate their difficulties. Then the industry could run as a team and nothing worked unless it was a team.

'I do plead with you, although it is preaching to the converted,' said Mr. Tate, 'to realize the benefit of these Associations with their meetings and free discussions. There is another thing. You elect your president and officers. Having put them there to make all the arrangements and get people to read papers it is up to you to support them. The Institution, though it may seem a long way off, is very interested and very concerned with your progress. We know through our friends and members of the Council how all our children throuhout the country are progressing and we watch your activities with great concern, hope, and affection.'

Referring to the Presidential Address of the retiring President, Mr. J. Woodcock (Colwyn Bay), which, in his absence through illness was read by his successor, Mr. C. E. Banham (Cardiff), Mr. Tate said that although there was a great deal in it of interest to all he did not share Mr. Woodcock's fears regarding diminishing coal reserves. Since the Ridley Report they had had the Beaver Report. They had also had the British Railways plan which would do away in time with a large proportion of coal and coke. He could not think that the railways would want more coal in 1965 than they did today. The British Electricity Authority would not want double in 1965 for there was no doubt that nuclear power stations would be playing a great part then. So, the 293 mill. tons forecast back in 1952 would, he was certain, not be needed in 1965.

In this industry we had our reply to this coal business. The gasification of oil, whether crude oil imported direct from the Middle East, fuel oil, or even poor grade petrol, was going to play a very big part in our gas making processes throughout the British Isles, although not so much in districts where they had coke ovens and refineries.

'We may think the flight to oil is a good idea tactically for if we have to come back to coal we have a complete gasification process. The research that is going on in Birmingham is, I would say, beyond the verge of success. It now merely waits for large scale plants to be put up so that we can get experience of gasification of coals which can be raised much more cheaply than carbonization coals.'

Education Facilities

Dealing with subject of education Mr. Tate said it was a difficult problem from a geographical point of view. 'Although I come from the Southern Gas Board,' he said, 'we have no technical institutions which will cater for us nearer than London. For that reason the Institution has offered to accept as a qualification or means of training the Higher National Certificate in Engineering applicable to so many branches of that profession. In addition there is the sandwich course which is gaining in popularity. There are new colleges embarking on that system of training and furthermore we are going another stage. Subject to satisfactory standards of teaching and examination we are prepared to have accepted the certificates awarded by technical colleges. The new education qualifications are necessary in order that the profession should maintain its status along with other engineering professions, and educational requirements are going up in every walk of life. We therefore felt some years ago that we had to keep abreast in order to attract the right type of people. We have linked ourselves to the higher national certificates generally and having done that we are exploring as fast as we can to maintain our standard while easing the path for those who want to take the examinations.'

Mr. Tate concluded by wishing the Association future success and adding his good wishes to the new President.

The New President

MR. C. G. REEVES (Cardiff), introducing the new President, said the Association was in the peculiar situation of having a President who was officially no longer in existence. In 1951 Mr. Banham had been reported killed in an air crash. 'He is a very old employee of the Cardiff undertaking,' Mr. Reeves went on. 'He has been there for something like 30 years and he has held office in the Association for the past 15 years. He is the local branch President for the B.G.S.A. and Secretary of the Cardiff Undertaking Welfare Club. He is an expert on income tax and financial matters and a very keen sportsman. He is a very worthy successor to Mr. Woodcock and I know you will join with me in expressing pleasure that after his hard work as Treasurer he now takes over the office of President.'

MR. BANHAM, taking over the chair, pledged himself to do his utmost for the good of the Association.

Mr. C. G. Reeves was elected Senior Vice-President and Mr. R. H. Hanford Junior Vice-President. Mr. S. G. Meade was re-elected Secretary and Mr. T. Edwards replaced Mr. Banham as Treasurer. Other officers elected were Mr. J. Newman, Hon. Librarian, Messrs. W. E. Crowley and T. E. Tyrrell, Hon. Auditors, and Messrs. C. J. Pope, K. L. Thwaites, and S. Landcastle, Members of the Council.

The report of the Association's Council drew atention to a falling off in attendance at meetings and revealed that one joint meeting with the Western Juniors planned for March 19 had had to be postponed until May 14 because of lack of support. A brighter note was struck, however, by the announcement that Mr. J. F. Day had been awarded the Silver Medal of the Society of British Gas Industries for his paper on 'Cathodic Protection.'

It was decided to amend Rule 8 of the Association to enable the North Wales area to be administered by a committee of eight instead of six. This, explained Mr. Meade, would improve the committee's facilities for pioneering work in a scattered area.

Dearer Gas Foreshadowed

Another increase in the price of gas to consumers in Coleraine and Portstewart was foreshadowed at a meeting of Coleraine Borough Council on April 4. It was stated that recent increases in the wages of shift workers and day workers granted by the National Joint Industrial Council for the Gas Industry which came into effect on April 3 would cost the Gas Department £655 annually.

Since March, 1953, when the price of gas was last increased by the Council the cost of wages increases had amounted to £1,717 per annum. This was equivalent to an increase of 3d. per 1,000 cu.ft. in the price of gas sold. There had also been since March, 1953, considerable increases in the price of coal, and a further substantial increase was imminent.

The Town Clerk and the Gas Manager (Mr. W. R. Armstrong) were asked to submit a report on the effect of the increases, with recommendations as to what increases in the price of gas would be necessary to offset them. The Gas Committee's report, which was adopted, stated that the amount of gas manufactured during March was 15,315,700 cu.ft., an increase of 1,185,100 cu.ft. compared with the corresponding period last year.

British Empire Medallists of the gas industry

Seven gas industry personnel received the British Empire Medal from Mr. Geoffrey Lloyd, M.P., Minister of Fuel and Power, on April 22; the names appeared in the New Year Honours List. One of the awards was for an act of gallantry in an unavailing attempt to rescue a fellow worker from a fume-filled coke hopper. The others were for long and faithful service.

Four of those present counted more than 200 years service between them. Those receiving medals were: Mr. C. W. Jack, an engine fitter with the South Eastern Gas Board, who performed the act of gallantry, Mr. J. H. Oxley, district gas fitting foreman, East Midlands Gas Board, Mr. H. Daley, a retired foreman of the North Thames Gas Board, Mr. G. Seagger, general foreman, South Eastern Gas Board, Kingston works, Mr. W. Purdew, an engineering foreman at the Cambridge works of the Eastern Gas Board, Mr. C. Robertson, mains inspector, Scottish Gas Board, and Mr. C. Coult, leading stoker with the North Eastern Gas Board. An eighth medallist, Mr. H. Vincent, a valveman with the Eastern Gas Board, was unable to attend due to doctor's orders.

The British Empire Medallists. Left to right: *G. Seagger, C. Robertson, H. Daley, C. W. Jack, C. Coult, W. Purdew, J. H. Oxley.* Below: *Mr. H. F. H. Jones with the medallists, their relatives, and guests at Gow's Restaurant.*

After the presentation ceremony the medallists and their relations and other guests were entertained by the Gas Council to a meal at Gow's Restaurant, in London, followed by a visit to the Jimmy Edwards show 'The Talk of the Town' at the Adelphi Theatre. Mr. H. F. H. Jones, Deputy Chairman of the Gas Council, joined the party at Gow's and went with them to the theatre.

Plumbers in the gas industry

The report has been issued of a Committee of Investigation appointed by the Minister of Labour and National Service to enquire into differences arising in the gas industry from the claim of the Plumbing Trades' Union to negotiate terms and conditions of employment on behalf of their members employed in gas distribution. The majority of men engaged in gas fitting are members of the National Union of General and Municipal Workers. A minority, mainly in Scotland and the North of England, belong to the Plumbing Trades' Union.

In general the wages and conditions of employment of gas fitters are negotiated through the National Joint Industrial Council for the Gas Industry, which includes on the workers' side representatives of the N.U.G.M.W. and other interested Unions, but not of the P.T.U. Since 1948, when nationalisation of the industry became imminent, the P.T.U., which had previously negotiated working arrangements on behalf of its members with individual undertakings, has twice applied for representation on the N.J.I.C., but has failed to secure the support of the workers' side. By an agreement of January, 1951, between the P.T.U. and the Gas Council, plumbers engaged as gas fitters in certain undertakings were paid the building trade rate for plumbers, but were otherwise subject to the conditions of employment negotiated for gas fitters by the N.J.I.C. In July, 1954, the P.T.U. gave notice to terminate this agreement and at the beginning of March this year threatened to withdraw the labour of its members. The strike notice was suspended on the appointment of the Committee. The Union maintained that it should either be given a seat on the N.J.I.C. or should have separate parallel machinery of negotiation.

The Committee recommends that the Plumbing Trades' Union should be represented on the N.J.I.C. and on area councils in those areas in which the strength of membership would justify such representation. The Committee endorses the view of the Gas Council that separate machinery for negotiation would be impracticable. The Committee is unable to support the proposal of the workers' side of the N.J.I.C. that the representation of the P.T.U. should be conditional on its undertaking to cease recruitment among gas fitters, but suggests that the N.U.G.M.W. and the P.T.U. should arrive at a working arrangement whereby each of the unions agrees to respect the existing position of the other in the field of recruitment. As a possible example of such an arrangement the Committee suggests that, in general, priority rights of recruitment in each depôt should rest with the union which has a majority of the gas fitters within its membership in the depôt. The Committee commends to the P.T.U. as 'a valuable gesture of goodwill' the withdrawal of its London District Secretary's circular of December, 1951, to which the N.U.G.M.W. has taken exception, and commends to the consideration of the unions in whatever arrangements they may make concerning recruitment that it is of great importance that no obstacles or barriers should be placed in the way of the integration of gas undertakings.

The Committee draws attention to a cleavage of interest between the two unions on the question whether gas fitting is a craft in its own right or merely a branch of general plumbing. It is proposed that a system of examination for gas fitters be maintained.

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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

APPROVED manufacturers of Gas-heated Wash Boilers and Washing Machines require experienced Sales Representatives to cover the North Western and North Eastern Gas Board Areas. Applicants will be required to reside in the area and should state age, qualifications, experience and salary required. Apply: No. 236, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

THE DOWSON & MASON GAS PLANT CO., LTD. Alma Works, Levenshulme, Manchester, 19, are expanding their activities in the building of many types of INDUSTRIAL FURNACES, and are requiring SERVICE ENGINEERS whose duties will include supervision of erection on site, starting up new installations and contract maintenance. Applicants should give details of experience, technical qualifications, and age.

NORTH EASTERN GAS BOARD

BRADFORD GROUP
BRADFORD DISTRICT
TECHNICAL ASSISTANT (DISTRIBUTION)

APPLICATIONS are invited for the above position at a salary within Grade A.P.T. 7 (Provincial 'A') (£585-£665 per annum) of the Salary Scales agreed by the National Joint Council for Gas Staffs. The commencing salary will depend on qualifications and experience.

Living accommodation may be available at a reasonable rental.

The candidate should hold the Higher Grade Certificate in Gas Engineering (Supply) of the Institution of Gas Engineers or an equivalent qualification. In addition he should have a working knowledge of both high and low pressure distribution systems and should be able, or prepared to learn, to drive a car.

The successful applicant will be expected to carry out work in connection with the design and layout of mains and services for housing estates, district or bulk supply mains, and act as Clerk of Works in connection therewith, as required. A knowledge of gas flow control equipment, governors, etc., would be an advantage.

The successful applicant will be required to pass a medical examination and to join the Board's Staff Pension Scheme.

Applications giving full details of age, experience, and qualifications, should be forwarded to the Group General Manager, North Eastern Gas Board, Bradford Group, Britannia House, Bradford, to be received by him not later than Monday, May 9, 1955.

J. C. GARDNER,
Secretary.

Bridge Street,
Leeds, 2.

WEST MIDLANDS GAS BOARD

WORCESTERSHIRE—HEREFORDSHIRE DIVISION
MAINS SUPERINTENDENT

APPLICANTS should have had good practical experience in all branches of high and low pressure distribution work, and should be able to prepare schemes for mainlaying projects of all types.

Possession of the higher Grade Certificate in Gas Engineering (Supply) will be an advantage.

The salary will be within Grade 9 (£655 to £755 per annum) of the National Salary Scales.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications, together with the names of two referees, should be sent to Mr. C. F. W. Rendle, Divisional General Manager, West Midlands Gas Board, Newtown Road, Worcester, within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

(*Classified advertisements continued on page* 262)

APPOINTMENTS VACANT (ctd.)

WEST MIDLANDS GAS BOARD

BIRMINGHAM AND DISTRICT DIVISION
HEAD FOREMAN—SWAN VILLAGE WORKS

THE combined works at Swan Village have a daily capacity of 22 million cubic feet per day from Continuous Vertical Retorts and Automatic Water Gas Plants.

Candidates must have a sound knowledge of modern gasworks practice and maintenance on a large works, with considerable experience as a foreman. The successful candidate will be responsible for the general organisation and supervision of labour, with special responsibility for co-ordination of internal rail and road transport.

The salary will be within Grade 10 (£715-£815 per annum) of the National Salary Scales.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

The person appointed will be expected to live within reasonable distance of the works as no works residence is available.

Applications, stating age, personal details, qualifications and particulars of training and experience, together with the names of two referees, should be addressed to Mr. J. E. Wakeford, Divisional General Manager, West Midlands Gas Board, Birmingham, and District Division, Gas Offices, Edmund Street, Birmingham, 3, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

NORTHERN GAS BOARD

TEES-SIDE DIVISION
HOME SERVICE ADVISER AND DEMONSTRATOR

APPLICATIONS are invited for the position of HOME SERVICE ADVISER AND DEMONSTRATOR. Salary within Grade A.P.T. 5 (£400-£464) of the National Joint Council for Gas Staffs. Initial placing according to qualifications and experience.

Candidates should be qualified in Domestic Science, and capable of conducting Demonstrations and Lectures in Domestic Subjects, and giving advice in the use of gas appliances.

The successful candidate will be required to pass a medical examination and join the Board's Pension Scheme.

Applications, stating age, personal details, qualifications and experience, together with the names of two referees, should be addressed to the undersigned so as to reach him not later than first post on May 10, 1955.

JOHN W. PALLISTER,
Divisional General Manager.

Gas Works,
Commercial Street,
Middlesbrough.
April 18, 1955.

NORTHERN GAS BOARD

(TYNESIDE DIVISION)
INDUSTRIAL GAS ENGINEER

APPLICATIONS are invited for the position of an INDUSTRIAL GAS ENGINEER as assistant to the Industrial Manager from persons who have had experience in the design, construction and installation of Industrial plant. Technical qualifications are desirable and a sound mechanical engineering background would be an advantage.

The appointment will be within Grade A.P.T. 11 (Provincial 'A' £740-£865 per annum) of the National Salary Scale for Gas Staffs.

The successful candidate will be required to pass a medical examination and be subject to the Board's Pension Scheme.

Application stating age, qualifications and experience should be sent to the Divisional General Manager, Northern Gas Board (Tyneside Division), 30, Grainger Street, Newcastle, within 15 days of this advertisement.

JOHN F. JACKSON,
Secretary.

APPLICATIONS are invited for the appointment of senior and intermediate DRAUGHTSMEN on the permanent staff of a firm of industrial pipework contractors in N.W. London. Salaries up to £800 per annum will be paid to men with suitable qualifications and experience. Applications stating age, education, training and experience should be addressed to: No. 237, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

EASTERN GAS BOARD

(CAMBRIDGE DIVISION)
PETERBOROUGH DISTRICT
DISTRIBUTION FOREMAN

APPLICATIONS are invited for the position of DISTRIBUTION FOREMAN at Peterborough District. Candidates should have good practical experience in laying of cast iron mains of all types and service laying. They should also be experienced in supervision and organising the work of main and service laying squads. The person appointed will be required to deputise when necessary for the Distribution Superintendent.

The salary offered will not be less than £455 per annum.

A flat is available at a moderate rent.

The successful candidate may be required to pass a medical examination.

Applications giving full details of training, qualifications and experience, together with the names of two referees, should be sent to the General Manager, Eastern Gas Board, Divisional Chief Office, 52, Sidney Street, Cambridge, by May 12, 1955.

EASTERN GAS BOARD

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FIRST Class Gas Fitter required to work in the Haverhill District. Full J.I.C. Rates of Pay (Provincial 'B') and conditions of service.

A good house is available at the Works entrance, at a nominal rental.

The successful candidate may be required to pass a medical examination.

Applications, giving age, present duties and references, should be addressed to Mr. H. R. Thomas, Group Manager, Gas Works, Bury St. Edmunds, Suffolk, within two weeks of the appearance of this advertisement.

NATIONAL COAL BOARD wish to appoint to the Carbonisation Department at Headquarters a METHOD STUDY ENGINEER (CARBONISATION) to advise on, and later to take charge of, the application of method study at the Board's carbonisation plants. The post is superannuable and the salary will be eventually in the range of £1,500-£2,000 (basic); initially a lower salary may be paid depending on qualifications and experience and the amount of training needed. Candidates should preferably have practical experience both of method study techniques and of modern carbonisation practice, but men experienced in only one of these will be considered.

Write, giving full particulars (in chronological order) of age, education, qualifications and experience (with dates) to National Coal Board, Establishments (Personnel), Hobart House, Grosvenor Place, London, S.W.1, marking envelope TT/963. Original testimonials should NOT be forwarded. Closing date June 7, 1955.
AE/7006.

SCOTTISH GAS BOARD

CHIEF ENGINEER TO THE BOARD

APPLICATIONS are invited for the post of CHIEF ENGINEER who will be stationed at the Board's Headquarters in Edinburgh. His duties will be generally to advise the board on the development of plans and methods to ensure maximum efficiency in connection with manufacture and distribution. The salary will be £2,500 rising to £3,000 by annual increments of £100. The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, together with the names of three persons to whom reference may be made as to experience and qualifications, should be lodged with the undersigned not later than May 27, 1955.

A. T. HERD,
Secretary.

26, Drumsheugh Gardens,
Edinburgh, 3.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
SENIOR TECHNICAL ASSISTANT (DISTRIBUTION)—
NORTHAMPTON GROUP

APPLICATIONS are invited for the position of SENIOR TECHNICAL ASSISTANT to the Group Distribution Engineer at Northampton. The commencing salary will be within the range £485/£705 per annum according to age and experience.

Applicants must at least hold the Ordinary Grade Certificate in Gas Engineering (Supply), should have a thorough knowledge of modern methods of distribution, including high and low pressure systems, and be capable of carrying out the detail work in connection with the planning and estimating of new work.

The post is pensionable, and the successful applicant may be required to pass a medical examination.

Applications, stating age and experience and giving full details of training and qualifications, together with the names of two referees, should be submitted to Mr. E. B. Craddock, Group Manager, 45, Abington Street, Northampton, not later than May 6, 1955.

H. B. TAYLOR,
Divisional General Manager.

Leicester.
April 13, 1955.

NORTH WESTERN GAS BOARD

SOUTH LANCASHIRE GROUP

APPLICATIONS are invited from suitably qualified persons for the following pensionable appointments:—

ENGINEERING DRAUGHTSMEN—Group Production Engineers' Department (Salaries within Grades A.P.T. 6/8—£530/£705 per annum)

Applicants should possess a sound mechanical engineering training and be experienced in the design and construction of gas works or chemical plant, including mechanical handling. Experience in the design and layout of steam, electricity and water services would be an advantage.

GAS CONTROL SUPERVISORS—St. Helens Works (Salaries within Grade A.P.T. 7—£585/£665 per annum)

The successful applicants will be required to control bulk supplies of gas over an extensive area, to keep records of gas makes, stocks and pressures, and to prepare day-to-day estimates. After a period of training they will be required to work on a shift system.

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B. (South Lancashire Group), Radiant House, St. Helens, within 14 days.

WALES GAS BOARD

PONTYPOOL UNDERTAKING

APPLICATIONS are invited for the appointment of DEPUTY ENGINEER AND MANAGER to the Pontypool Undertaking.

The Pontypool Works is a new works with a present capacity of 4 million cubic feet per day. Thorough experience of modern manufacturing methods, including continuous vertical retort plant, is essential. In addition, applicants should have sound knowledge of modern distribution practice, and of management and administration of gas undertakings.

Applicants must be Chartered Gas Engineers.

The commencing salary will be £1,000 per annum.

The successful applicant will be required to pass a medical examination and join the Board's Superannuation Scheme.

Applications, giving details of age, qualifications, experience and present position, together with the names of two referees, should reach the undersigned not later than May 9, 1955.

C. B. MAWER,
Secretary to the Board.

2, Windsor Place,
Cardiff.

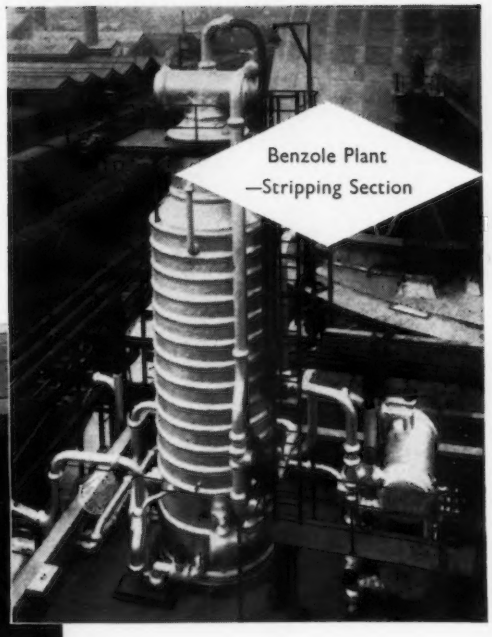
Gas Journal, February 16 and March 9

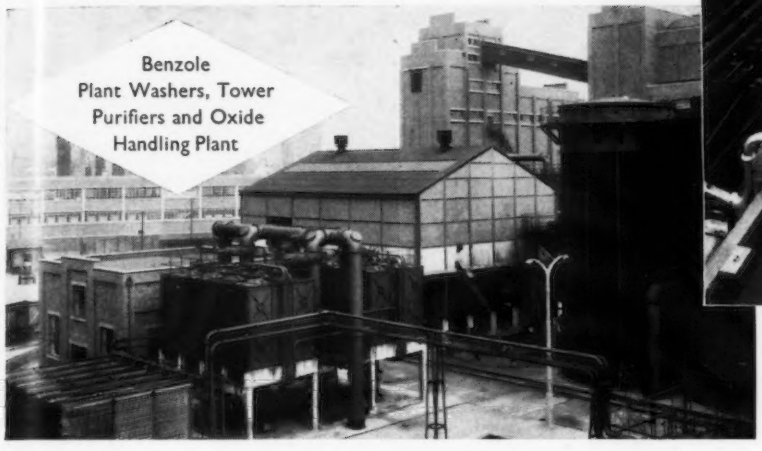
Both the above Journals are "out of print". If any readers have copies no longer required could they please help us by returning them to

Walter King, Ltd., 11, Bolt Court, Fleet Street, E.C.4.

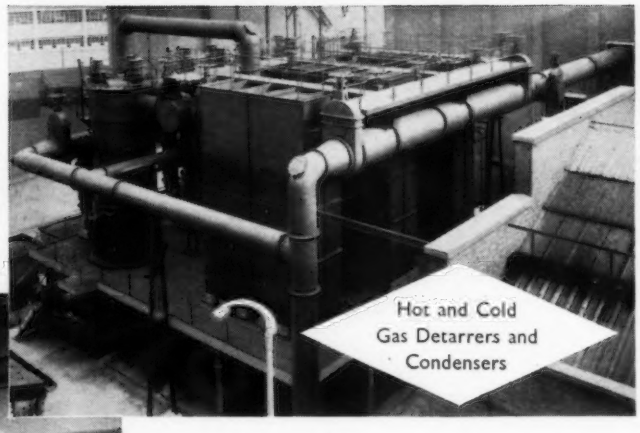
Postage would be refunded.

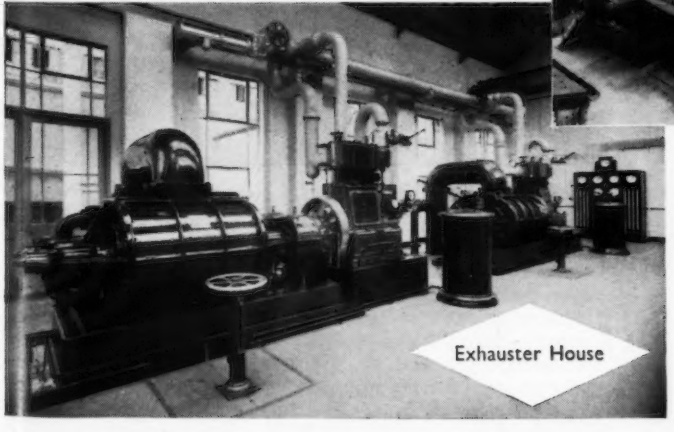
A major contribution





to the all-round efficiency of the new Gas Works at Stoke-on-Trent





Illustrated is some of the Holmes plant, designed to treat 10,000,000 cu. ft. of gas per day. By kind permission of the West Midlands Gas Board.

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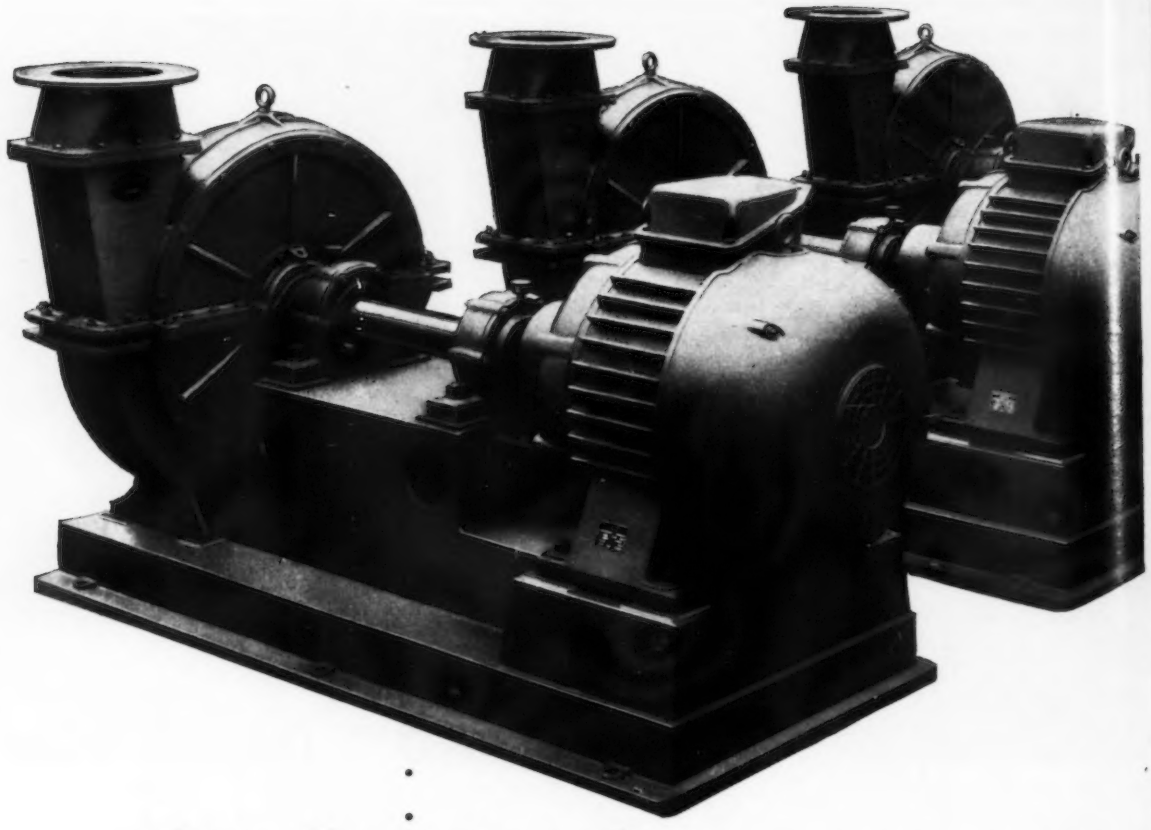

Gas Boosters?

EXAMPLES of gas boosting fans with cast iron casings are illustrated here. They represent the results of special attention to the design and development of robust, trouble-free boosters over the years. This experience provides fans for handling volumes of 5,000 to 1½ million cubic feet of gas per hour at pressures up to several pounds per square inch.
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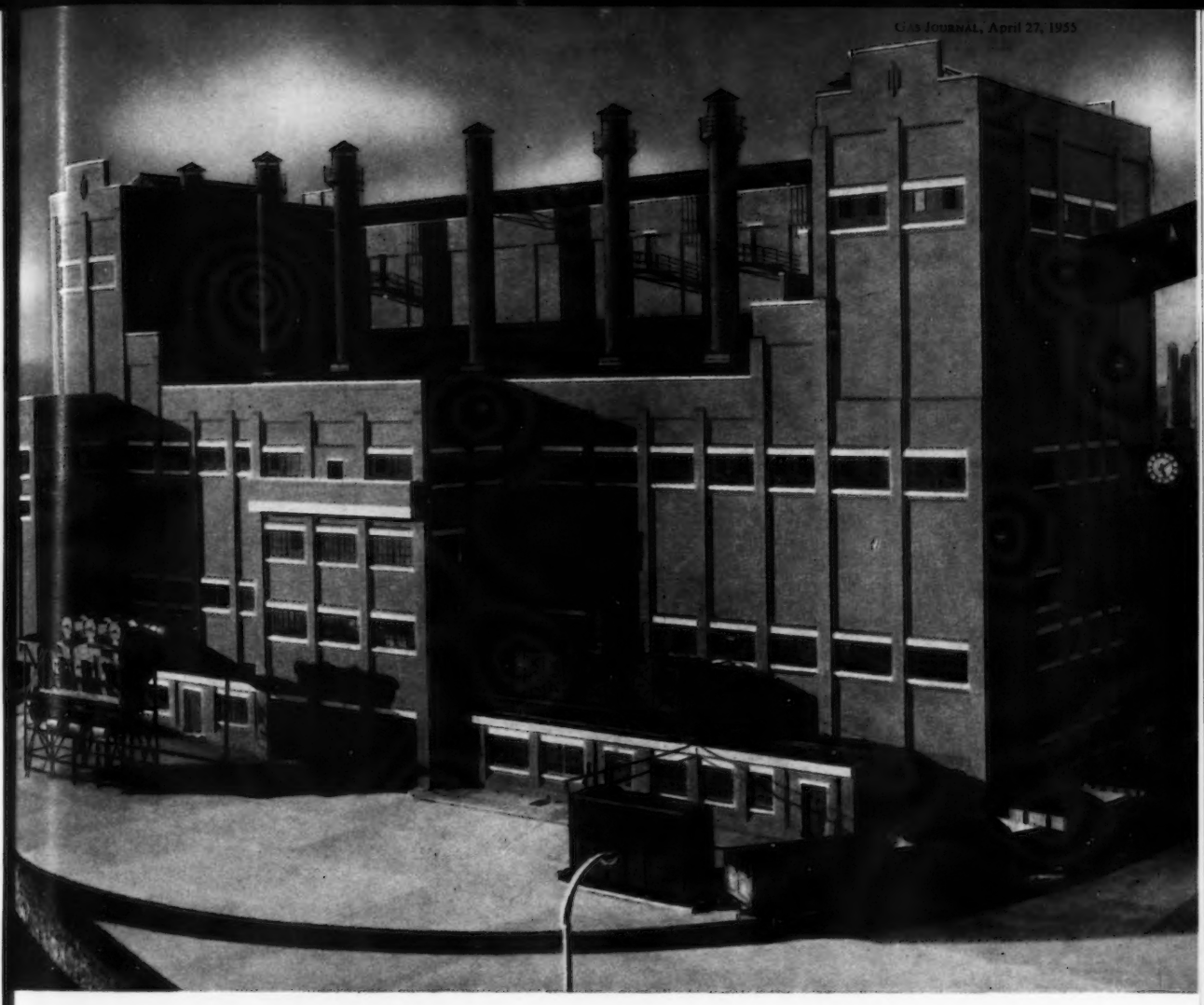

THE NEW PLANT AT ETRURIA

The recently completed installation at the Etruria (Stoke-on-Trent) Works of the West Midlands Gas Board has a nominal daily capacity of 8,000,000 cu. ft and consists of 96 Glover-West Continuous Vertical Retorts in "Balanced Heating" settings, with coal and coke handling plant.

This is the third Glover-West retort house at Etruria, the first having been in operation since 1928. There are now 260 Glover-West retorts at the Works, with a nominal capacity of more than 22,000,000 cu. ft per day.

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